THE ENGINEERING AND MINING JOURNAL
AND
COAL

Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XLI. JUNE 5. No. 23.

RICHARD P. ROTHWELL, C.E., M.E., ROSSITER W. RAYMOND, Ph.D., } Editors.

☞ **Articles, communications, reports, documents, books—all things whatsoever belonging to the Editorial Department, should be thus addressed: MANAGING EDITOR ENGINEERING AND MINING JOURNAL, P.O. BOX 1833, New York City.**

Cable address: "Rothwell," New York.

Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus *; and only for articles so signed is he responsible.

SUBSCRIPTION PRICE, including postage for the United States and Canada, $4 per annum; $2.25 for six months; all other countries, including postage, $5 = 20s. = 25 francs = 20 marks. All payments must be made in advance.

FILE COVERS will be sent by mail for $1.25 or delivered at office for $1 each.

Advertising Rates.—See page XIV.

Mr. C. A. Green is our accredited representative for New York.

Mr. A. R. Brown, Jr., is our accredited representative for Boston and the Eastern States. Office, 23 Doane street, Boston.

Mr. J. Viennot, 150 South Fourth street, Philadelphia, is our accredited representative for Pennsylvania Maryland, and Delaware.

Mr. O. D. Cotton, Columbus, O., is our accredited representative for Ohio, Illinois, Missouri, Iowa, Michigan, Indiana, and the Southern States.

Mr. O. J. Frost, care Boston & Colorado Smelting Company, Argo, Colo., is our accredited representative for Denver and vicinity.

REMITTANCES should always be made by Bank Drafts, Post-Office Orders, or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., Publishers.

R. P. ROTHWELL, Pres. HENRY M. GEER, Sec. and General Manager,
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

EDITORIALS: PAGE
Experiments with Steel Rails in Russia 405
Dr. Frazer's Extra Leaf 405
The Dividends and Capital Account of English Railroads 405
The Copper Market 406

CORRESPONDENCE:
Butte, Montana, Notes 407
The Copper Market 407

Microscopic Examination of Iron and Steel 407
The Pyrites Deposits of the Alleghanies 407
Emery Mines of Asia Minor 410
Experiments Made with Steel Rails in Russia 412
Patents Granted by the United States Patent-Office 413
Furnace, Mill, and Factory 414
Proposals 414
Labor and Wages 414
Transportation Notes 414

NOTES:
De Lalande's Primary Battery 406
The Indian Engineer 410
Sneius on Cost of Steel Rails 410
The Ritter Perspectograph 413
The Sargent Rock-Drill on the Croton Aqueduct 413
Thermometers for White Heat 413
The Polarity of Tadpoles 413
Properties of Fluids and of Solid Metals 413

COAL TRADE NOTES:
Colorado 414
Illinois 414
Oregon 414
Pennsylvania 414

COAL TRADE NOTES: PAGE.
Virginia 414
West Virginia 414

GAS AND OIL NOTES:
Colorado 414
Pennsylvania 414

GENERAL MINING NEWS:
California 414
Canada 414
Colorado 414
Dakota 415
India 415
Mexico 415
Michigan 415
Montana 415
Nevada 415
Utah 415
Wisconsin 416

MARKETS:
Silver, Copper, Tin, Lead, Spelter, etc. 416
Iron Market Review 417
New York 417
Philadelphia 417
Pittsburg 417
Louisville, Ky 417
St Louis 417
Coal Trade Review 417
Statistics of Coal Production 417
New York 419
Buffalo 420
Boston 420
Pittsburg 420
FREIGHTS 422

FINANCIAL:
Mining Stocks 420
Coal Stocks 420
Boston Copper and Silver Stocks 421
Advertisers' Index xv

THE experiments that have been made with steel rails in Russia, as given on another page, are important, even though they do not teach us yet just what will give us a durable rail. They afford valuable data to those who may take up the important work here of investigating the requirements for durability in steel rails.

WE have received from Dr. PERSIFOR FRAZER an extra leaf, to be pasted in the pamphlet on *The Work of the International Congress of Geologists and its Committees*, reviewed by us April 17th. This leaf contains a Table of Contents, constituting a very neat and sensible acknowledgment, on the part of Dr. FRAZER, of the justice of our complaint against the original edition. We learn that the first 300 copies of the pamphlet have been disposed of, and that, in view of the unexpectedly large demand for them, 300 additional copies have been prepared, including the Table of Contents and the lithographed color-scale. Dr. FRAZER, No. 201 South Fifth street, Philadelphia, will mail a copy to any address, on receipt of 54 cents to cover price and postage. As we understand, this edition exhausts the supply of the color-scale; and it is superfluous to point out that this opportunity of obtaining it should not be lost by any American geologist. *

THE DIVIDENDS AND CAPITAL ACCOUNT OF ENGLISH RAILROADS.

The English papers not infrequently charge Americans, and especially Americans connected with mines and railroads, with dishonest practices. Now, every one knows that the ENGINEERING AND MINING JOURNAL is always ready to expose dishonesty and place the responsibility for dishonest transactions where it rightfully belongs, whatever the nationality or position of the offenders.

In Anglo-American mining swindles, as we have often shown, the operation is always effected through the co-operation of English promoters, and the more or less dishonestly permitted use of distinguished names, which help to float the concern and thus swindle the stockholders.

In railroads, the losses usually come in a less sudden manner than in mines; stocks and bonds decline in value, because a road ceases to pay dividends; but the road itself is still there, and when it is found that the bondholders finally sell out the stockholders, the failure is frequently properly attributed to the influence of new competing lines, and only rarely to the dishonesty of managers. So long as dividends are large and regular, no amount of dishonesty appears to attract attention, or to receive condemnation, on either side of the Atlantic.

This well-recognized fact has led to the payment of many unearned dividends, and the usual and simple means for continuing to do this is by the issue of additional stocks or bonds.

Expenditures that properly belong to working expenses, and should come out of current receipts, are charged to capital account for so-called "improvements," and the amount necessary for the payment of "the regular dividend" is thus easily obtained from an apparent though really fictitious profit, the amount of "profit" apparently earned being simply a question of the amount of operating expenses or repairs charged to capital account. The principle is, however, precisely the same as when a banker pays unearned dividends out of his depositors' money.

It would not be difficult to cite instances among our own railroads where this has been done, the facility with which railroad bonds and stocks are placed seeming to make the practice more frequent in railroads than in mines or other enterprises.

The English appear to be experts in this peculiar form of "finance."

Not a little credit is taken by Englishmen for the regularity with which English railroads pay dividends, and the fact is used to the discredit of foreign, and more particularly of American, roads. Yet the following startling statement seems to explain the probable source of these large and frequent dividends, as well as the reason for the exorbitant charges for freight and passengers made on English railroads, and which are now creating much comment among the overburdened mining and manufacturing industries dependent on them for an outlet.

From a careful compilation of official statistics, it appears that in 1870 the average cost per mile of all the railroads in the United Kingdom was £34,106, and in 1884 it was £42,486—an increase of £8380, or about $41,900 per mile.

This great increase was made long after the roads had been completed, after the "parliamentary" and "right of way" expenses had been incurred, and it amounted to an additional cost per mile equal to two thirds of the nominal first cost, and it is actually more than the average cost of all the American railroads.

The cost of the reported increase of the rolling stock, averaging less than £1000 per mile, does not justify this enormous increase in capital account.

How, then, was the money expended? It would, indeed, appear that the managers of English railroads have been either "watering stock" under a tremendous "head," or that they have been borrowing on "debentures" the money to pay dividends.

And the enormous "cost" of English railroads, which is given to justify the high freight charges, may, after all, represent in great part only what on this side is called "water," or even a harder name.

It would appear, therefore, that, so far as the financial management of the English roads is concerned, they are no better than our American

roads, while technically the cost of maintaining and operating them and their freight and passenger charges are much heavier than ours.

Mr. E. B. DORSEY, in a paper read before the American Society of Civil Engineers, entitled "English and American Railroads Compared," gives the most elaborate statistical data establishing the less cost and greater durability and economy of American rolling stock, and the smaller operating expenses as compared with English roads. These data can be consulted with profit by the managers and stockholders of roads in foreign countries, not excepting the managers of the English roads; indeed, we know that the facts brought out in this paper have already attracted the attention of the distinguished head of the greatest of the English roads, and no doubt the fruit of this will be shown in the adoption of some American ideas.

THE COPPER MARKET.

The state of the copper market of the world offers an interesting subject for study in economics. If statistics regulate price, the price should be good; but the price is, on the contrary, very low. The following averages of production and consumption since 1880, taken from MERTON & CO.'s circular of May 8th, contradict the assumption that the price is controlled by the amount of visible supply:

Copper production of the world, tons:

1880.	1881.	1882.	1883.	1884.	1885.
153,057	161,711	177,823	197,936	217,483	221,715

Average supply of Europe on first of each month, tons:

1880	1881.	1882.	1883.	1884.	1885.
64,589	59,703	51,426	50,111	45,912	55,220

Average price of Chili Bars, per ton:

1880.	1881.	1882.	1833.	1884.	1885.
£63 1s. 3d.	£61 1s. 3d.	£67 0s. 0d.	£63 9s. 6d.	£54 15s. 5d.	£44 0s. 6d.

Visible supply of copper in Europe, May 1st, 1886, 61,069 tons.

Price of Chili Bars, per ton, £41 7s. 6d.

In 1885, there were, on an average, 2369 tons of stock on hand less than in 1880, and yet the price was £19 per ton less. On the other hand, the world's production in 1885 was 68,000 tons in excess of the world's production in 1880.

That this enormous increase should have been absorbed, must be attributed in part to the low price; for production and price have kept pace with one another, but in opposite directions. As production has gone up, price has gone proportionately down, the balance of supply remaining comparatively constant. If increased production be the sole cause of decline, and copper can continue to be produced in ever-increasing quantities at proportionately decreasing cost, it would be impossible to fix the limit of decline; but we do not think this is the sole cause of the decline, and it is reasonably certain that the world can not be supplied with copper at its present value.

We consider that the prevailing price is abnormally low, and is due to the absence of speculative energy the world over, and to apprehension lest the extraordinary increase of the last five years should prove to be an ordinary growth, and that, during the next five years, the world's production can expand another 46 per cent, or to 322,000 tons, and at a price that will insure its absorption. We have before pointed out how utterly erroneous is such a supposition. The principal increase has come from this country, and is mainly due to the rapid opening of the West by railroads and the efforts of the Calumet & Hecla mine to maintain the old standard of profits by straining its appliances for production to the utmost. But the Western mines have all, without exception, been working at high pressure and on rich surface ores, which some of them have already exhausted; while the Lake mines have, one and all, reached the limit of their hoisting and crushing capacity. New Western mines may be discovered, and others may augment their output, while Calumet & Hecla may see fit to sink vertical shafts and to build new mills; but such enormous undertakings can not be completed in a month or in a year. Meanwhile, the country's demand for copper is not likely to grow less clamorous. Our present consumption of copper is over 1·6 pounds per head of population. Within the next decade, statisticians anticipate an increase of 20,000,000 inhabitants, to supply whose normal demand at present rate of consumption 32,000,000 pounds will be required. Unless, therefore, our production should increase, our exports will fall to a very slender figure. We fail, therefore, to see any reason for believing that the future production of this country will gain on its future consumption. And the same is equally true of the rest of the world. One mine only on the Spanish peninsula can imitate successfully Calumet's policy of expansion. But let these great mines pour forth their copper as abundantly as the most vigorous administration may command, yet they can not satisfy the wants of the world. If we place the output of

	Pounds.
All the Iberian mines at	94,000,000
Calumet & Hecla	50,000,000
Anaconda	36,000,000
	180,000,000

or we account for only 36 per cent of the world's present consumption. If, therefore, these first-class mines could make fair profits at reduced prices, and should attempt to acquire absolute supremacy by increasing production and killing off the second and third-class mines—a policy we do not for the moment attribute to them—the attempt would fail; for let them strain their resources to the utmost, they could not possibly supply the world's market at present, let alone its prospective demands; and therefore, the market would be obliged to concede a living price to their feebler competitors. But it does not appear that these large mines are all making fair returns to their owners. The reports of the great Spanish mines show that their profits are seriously threatened. Calumet & Hecla has not been able to compensate for reduced prices by reduced cost of production; and Anaconda can not be making a legitimate mining return on the large investment made on its behalf. Whatever loss of profit low prices entail on small mines, they entail a proportionately greater one on large mines. Every cent's decline in the value of copper means a loss to Calumet & Hecla stockholders of half a million dollars yearly. If, therefore, the present prices are reducing some of the larger mines to straits, and are rendering precarious the existence of some of the smaller mines, on whose survival the world depends for its supply, it would seem as if those mysterious laws about which political economists talk so wisely, and yet know so little, which regulate supply and demand, would interfere to adjust the balance by applying the only remedy—a better price. As long, of course, as the supply is maintained and speculation is dead, the market will not experience actual famine, and prices may not revive; but if consumption be not checked, we are persuaded that even the present production can be maintained only by the stimulus of better price.

Artificial means might be resorted to in order to force up prices. The balance between supply and demand is so nearly maintained that a contraction in production of even 20,000 tons a year, or 10 per cent of the output of nine of the world's great mines, would create a dearth of copper. While this simple remedy can not be as summarily applied to Spanish copper mines as to Pennsylvania coal mines, owing to the enormous quantities of ore in process of protracted treatment, even in that extreme case, some curtailment could be effected. The parties to such an agreement would be so few, and the benefits so palpable, that it would certainly be the part of wisdom were these few mine-owners to husband in this way ores that can not be reproduced, rather than force their copper on a satiated market.

In this country, the tariff might be used to advantage were the large producers to agree to put on the home market at a fair figure only as much as it would healthily absorb, and export the remainder. It is to be regretted that some such arrangement is not effected; for it is not to the benefit of any one that an important industry should languish from low prices. And when our price falls, as it now has done, to almost below the level of the world's market, our copper producers are heavily handicapped by our protective system. They should therefore, in self-defense, adopt some means to shield themselves. Every thing our copper miner uses is protected, and costs him more than it costs most of his foreign competitors. He must pay an equivalent corresponding more or less to the duty on his iron, his steel, his lumber, his coal, and his coke. And these imposts, which mean an artificially increased cost of production, he may legitimately endeavor to offset by some artificial measure for securing the protection the tariff extends to himself.

A stable price, if sufficiently low, undeniably fosters trade. This benefit has been in past years secured to our manufacturers by the successive combinations of the Lake companies, and we see no reason why it should not be perpetuated. Our copper mills have not suffered from those repeated fluctuations in price that have rendered business in that line so precarious beyond the sea, and we can not but attribute to this cause in great measure the larger prosperity and increased business they have enjoyed. The old Lake combinations were, in fact, inaugurated at the request of the manufacturers. They did good service, and to-day we believe a wider combination of producers would be not only practicable, but would be hailed with satisfaction by our manufacturers, who are, in the popular mind only, supposed to suffer from such stimulants.

De Lalande's Primary Battery.—The Lalande primary battery, which has been introduced into England for electric lighting purposes, was recently subjected to a series of tests by Dr. Lummel, a German physicist. The element consisted of an iron vessel having its bottom covered with peroxide of copper. The neck was closed by an India-rubber stopper, through which passed a zinc cylinder, and the exciting solution was a potash lye. The products of the cell are zincate of potassium and metallic copper. The electro-motive force of the cell was determined by Dr. Lummel to be from 0·5 to 0·8 of a Daniell cell, and the internal resistance 0·1 Siemens unit. With a Siemens unit in the external circuit, the cell gave a current of 1 ampère. After six days' working through this external resistance, the strength of the battery was found to be unimpaired. The inventor states that the battery, if exhausted, can be restored by passing a dynamo current through it; but Professor Helmholtz points out that this can only happen when the currents are so strong that the iron becomes passive and the copper oxidized.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

Butte, Montana, Notes.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: the decline of Calumet & Hecla copper to 10 cents fell in this camp like a bombshell, and created quite a disturbance among the copper prospectors. However, when it was known that our copper companies would continue to run regularly, and it was found that in January and February, 1885, Lake copper was not higher than 10 cents, a better and more hopeful feeling returned.

In copper and silver properties, no change has occurred since my last letter.

The Anaconda proposes to run as before, in order to make 36,000,000 pounds of fine copper a year. They are going to erect a 40-stamp mill for custom silver ores at Anaconda, thus reducing the general expenses of the whole plant. Near the town of Anaconda, and near Silver Lake, various silver mines have been opened, and the Anaconda plant is the nearest outlet.

The Gray Rock mine has been leased to Mr. Tibbey for one year; it is producing copper-silver ore. This will probably be treated by the Butte Reduction-Works.

No other changes to report. NICK.

BUTTE CITY, May 29.

The Copper Market.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Referring once more to the copper situation, I gave in my last letter what I believed to be the general facts as to the entire production and consumption; but there is another factor to be noticed. Of the copper consumed in the United States, about 50 million pounds must be Lake, about 25 million more may be Lake or Electrolytic and Arizona. A further 30 million may be casting or Montana copper. There are about 105 million pounds of Lake, Electrolytic, and Arizona copper produced, with a consumption of 75 millions. Of the 55 million pounds of other copper produced in this country, exports for the first five months of this year have been at the rate of 30 million pounds, leaving only 25 million pounds for this market. This allows 5 millions of the 30 millions excess of the higher grade coppers to be used for casting purposes, and leaves only 25 millions of metallic copper to be exported. Of this amount, 8 millions, it is understood, have already been sold by the Calumet & Hecla in addition to the 6,350,000 pounds already exported, so that for the remaining seven months of the year, an export of about a million and a half pounds a month of ingot copper in addition to the ores and mattes already going abroad, should account for our entire production; and as there are orders in market for export for Lake copper at 10⅛ cents, and as Arizona bars are worth about as much for export as they are here, it is clear that present prices will soon take care of our surplus production, and unless the large producers are determined to maintain lower prices for the purpose of closing down smaller and poorer mines, higher prices must soon prevail. It will be well for the large and rich companies to remember that their present policy of destroying their weaker neighbors may be held up against them in some future contest for the removal of duties that these same companies now declare are necessary for their protection. If the consumer be once educated up to the belief that these companies can afford for any reason to give them copper at prices lower than the free-trade nations are getting it, they will be very loath to see the price of copper put four cents above the price of the world, when some returning wave of prosperity or some combination forced upon the producers serves as an excuse for again utilizing the four cents duty for putting our price above that of Europe. COPPER.

NEW YORK, June 3.

MICROSCOPIC EXAMINATION OF IRON AND STEEL.

The growing importance of microscopic examination of iron and steel is more and more recognized in Germany. In the May number of *Stahl und Eisen*, we (*Engineering*) notice that arrangements have been made at the government testing establishment at Berlin to render very valuable assistance to manufacturers, engineers, and others who may desire to make microscopical examinations of their materials. The cutting and preparation of the necessary sections is an operation requiring special skill and special apparatus. The testing establishment undertakes to prepare sections of samples sent, on payment of certain fixed charges, and, what is far more important, Dr. Wedding, the celebrated German metallurgical authority, undertakes to examine all sections so cut, if desired, and to see that they are properly prepared for the special objects in view. He will also, if specially desired, draw the attention of those for whom the sections are prepared to any special characteristics that may be apparent, and, in case drawings are to be made, will see that such special characteristics are duly emphasized in the drawings. This he will do so long as shall seem necessary, that is to say, till knowledge and experience in this method of examining iron and steel are more diffused than at present. The charges to be made for preparing sections appear very reasonable. If specimens are sent ready prepared for the cutting of the sections, the charge is from 3s. to 5s. If the specimens require preparation, a further charge of from 1s. to 5s. is made, according to the size and hardness. A drawing costs from 20s. to 30s. By this arrangement, any person wishing to make use of the microscopic examination of some special sample or samples can be assured of having them prepared in the best way, and if he desires it, he can have the personal guarantee of Dr. Wedding that the work has been properly done. Also, if he is inexperienced in such work, he will, on request, have his attention directed by the same eminent authority to special points that might escape his notice. Such a system, if fully carried out, can not fail to be of great value to scientific metallurgy, and to bring about a greatly extended knowledge and use of the microscope.

THE PYRITES DEPOSITS OF THE ALLEGHANIES.*

By Arthur F. Wendt.

The ancient slates, forming a considerable portion of the earth's crust, have, from time immemorial, been cited as storehouses of great mineral wealth. Second only to the vast iron ore deposits within their bounds, are the huge bodies of iron pyrites found imbedded therein, in every quarter of the globe.

The country-rock, in the immediate contact with the beds of pyrites, is usually talcose or quartzose, sometimes argillaceous or chloritic slate, changing by degrees into mica-schist and gneiss rock.

Staurolites and garnets, in large quantity, are frequent in the schists. Fine crystals of hornblende and epidote are not rare, and calcite, quartz, mispickel, and molybdenite are not unusual. Geologically, the ores are found in the Taconic or Eozoic and Silurian slates, although occasionally more modern formations, for instance, the Devonian slates of the Hartz Mountains, serve as their repository.

In every instance, the pyrites form true ore-beds (Erz-Lager), and, as such, present evidence of contemporaneous origin with the inclosing rocks, or, more properly speaking, of deposition subsequent to the original foot-wall, and anterior to the original hanging-wall. It is, indeed, often noted that the character of the slate-walls of these pyrites deposits differs widely, showing a change in the conditions of the deposition before and subsequent to the accumulation of the pyrites. The source of these pyrites has been and still is a vexed question.

It is scarcely credible that fissures, miles in length, and in places hundreds of feet in width, could exist a sufficient time to allow of their being filled uniformly with a deposit of pyrites. Sharply-defined horses of country-rock would certainly be frequent, whereas, in fact, they do not, to my knowledge, occur in any pyrites deposits.

It is much easier to conceive of a deposit of pyrites accumulating in a manner similar to an iron ore deposit, and of a subsequent concentration or mechanical rearrangement of the unsolidified grains of such a deposit into basins or hollows, thus eventually forming the enormous characteristic lenticular masses of pyrites found at widely distant points.

The great width of these deposits, reaching 350 feet at Ducktown, 250 feet at Agordo, 400 feet at Fahlun, 320 feet at Rio Tinto (Huelva), and the even greater lengths varying from 600 to 3000 feet, and, furthermore, their remarkably uniform character throughout, would alone render a vein formation most improbable.

Neither can a vein formation or origin explain the occurrence of what, at Ducktown, is termed "slate ore." That is a true slate in no way differing from the country-rock, which contains copper pyrites in minute lenticular masses, so dove-tailed and interstratified, and following every flexure of the slate itself, that a contemporaneous origin must, of necessity, be accorded to it.

At Ducktown, the Hiwassee series of mines, forming a belt several miles in length, is thus constituted. In Fannin County, Georgia, a similar occurrence takes place. At Stone Hill, Cleburne County, Alabama, R. P. Rothwell has described a like deposit. Ore Knob, although more pyritous, will undoubtedly fall within the category of ore-beds; and farther north, the Virginia mines, the Gap mine in Lancaster County, Pennsylvania; St. Anthony's Nose, New York; Charlemont, Massachusetts; and many of the deposits scattered through New Hampshire, Vermont, Maine (notably at Blue Hill), and at Capelton, Canada, and in Newfoundland, present similar features, and *all* must be classed as ore-beds proper.

Von Cotta describes a similar bed of "slate-ore," many miles in length, as occurring in the Carpathian Alps in the Bukowina of Hungary; Von Groddeck, a similar quartzose bed at Oryarfvi, Finland.

Röoras, in Norway, presents a striking example of the formation of these pyrites beds with very little subsequent change of position. Two beds, each 10 feet thick, are superimposed on each other. The cut clearly illustrates their character (Antwerp Exhibition). The lower bed is 1700 meters long from cropping to cropping; the upper, 500 meters. In a north and south direction, the lower bed has been worked over an area 600 meters wide. The hill of hard Gabbro has evidently protected the underlying measures from erosion and preserved the pyrites beds intact.

The occurrence of smooth, well-defined walls can not be surprising if the dissimilarity of the ore and inclosing rock is considered. The line of junction of such dissimilar material would naturally become a well-defined plane of motion in the metamorphism and subsequent elevation of the strata, thus producing the slickensides and gouge commonly attributed only to true fissure-veins. Perhaps the most conclusive proof of the character of these deposits has been given by the Fahlun, Agordo, and East Tennessee mines. In depth, they all pinch, and eventually are completely cut out.

At Agordo, the ore-body disappears at a depth of 500 feet. At Fahlun, the section of the ore at the 50-fathom level is 110 by 120 by 140 by 160, and these dimensions diminish to 50 by 40 by 50 by 43 feet at the 180-fathom level. Within the last few years, a huge cave has taken place at Fahlun, by reason of the almost complete exhaustion of the ore-body and consequent attempt to remove pillars. A most striking example is furnished nearer home, by the East Tennessee mine, of Ducktown, of which a sectional plan is annexed. This ore-deposit has been sometimes erroneously pronounced a fissure-vein. The section shows the complete pinching out of the original ore-body and the cutting of what is undoubtedly the edge of a similar one in depth. This new discovery naturally leads to the question of the persistence of these mines in depth.

Taken in the usually accepted sense of uninterrupted continuance as in a true fissure-vein, these deposits certainly come to an end in depth.

For all practical purposes, however, they extend indefinitely in depth, as it is undoubtedly a general law that, on the pinching of one ore-body, a new ore-body will be struck by sinking lower and cross-cutting into the foot. This has been repeatedly the case at Vershire, Vermont, and is known to have occurred in many iron mines, both in the East and Lake Superior, and in the similar Franklinite mines of New Jersey.

So strongly has this fact been impressed upon the writer that explorations, conducted by his advice, on the basis of this law among others, at

* Reprinted from Vol. VII. of the *School of Mines Quarterly*, New York, 1886.

the Union mine, Vermont (see Fig. 3), have led to the discovery of fine bodies of rich ore in a practically barren and abandoned mine.

Prospecting under similar conditions will surely lead to similar results elsewhere.

The ore-bodies in the old slates are strung along the strike of the rock as peas in a pod, or sometimes *en échelon*. On their strike, the ore-bearing series often measures many miles, and there is no valid reason why the same agencies that have produced these lenses of ore along the present croppings of the rocks should not have acted in depth as well.

If we consider that what are now the croppings are so simply by reason of extensive denudation, and that these croppings formerly constituted the rocks at great depth below the surface, it would seem a self-evident law that, so long as the slates continue toward the deep, bodies of pyrites may be confidently searched for.

The croppings of the beds of pyrites are always more or less decomposed, depending primarily on the *latitude* under which they are found.

All the northern beds of pyrites have had their decomposed portions in a measure scoured away by glacial action, and crop out almost unchanged as yellow sulphuret.

Such was the case in Canada and Vermont; probably also in Norway and Sweden: for the occurrence of oxides and carbonates is not mentioned at Fahlun and Röoras.

But in Spain and in Virginia, North Carolina, Tennessee, and Georgia, the pyrites have been completely decomposed to a considerable depth, sometimes several hundred feet, and in their place huge masses of iron croppings, the "gossan" of the Cornish miner, cover the surface.

Below the gossan and *above* the undecomposed yellow sulphurets, the copper that was originally contained in the croppings has been re-precipitated, forming the rich layers of "black" ore that first gave fame to the Ducktown mines, and which were worked many centuries ago by the Romans in Spain.

Two sections of Ducktown mines are annexed that clearly illustrate the occurrence of these decomposed ores at the Mary and Isabella mines.

That this decomposition is still steadily going on is evinced by the copper waters pumped from some of the mines.

Thus the Rio Tinto (Tinted River), of Spain, owes its name to the products of decomposition of the Huelva mines carried off by its waters.

Over forty years ago, when the Ducktown mines were first opened, the drainage from them entering the Ocoee River (a rapid-flowing river over one hundred yards in width) vitiated that stream to such an extent that fish died by tens of thousands, creating a veritable pest-house by their decomposition along its banks. Even now, the strong chemical action going on under ground is evinced by the heat of the ground over the Eureka mine, of Ducktown. Snow will barely lie on the ground above the mine before melting, and a wooden pump, raising the mine water to the surface, is all the machinery required to obtain 3000 pounds of cement copper per month from the stagnant mine waters.

In 1859, the Hiwassee, Eureka, and Isabella mines produced 40,000 pounds of copper monthly from this source alone.

The history of all the pyrites deposits of the Appalachian chain is best illustrated by that of Ducktown, the first to be discovered, and the one wrought on the largest scale commensurate with its resources.

The Ducktown Copper District is located in the southeastern corner of Tennessee, and but a few miles from the North Carolina and Georgia lines. In the latter State, several deposits are found, which form the continuation of the Ducktown ore-belt.

A heavily wooded, hilly table-land, some 1800 feet above the sea, surrounded by high mountains, met the view of the first explorers of the Ducktown region. Huge masses of iron ore (gossan) attracted the attention of Dr. Troost as early as 1849. Even before this date, in 1843, a Mr. Semmons had discovered copper ores, but failing to recognize them as such, rejected them as refuse, and collected a quantity of iron pyrites that he mistook for gold. Some iron forges, established in the vicinity, using the iron ore of the gossan, had found their iron to be "red-short" from the presence of copper.

The first shipments of ore from the district were made by a German mining engineer, a Mr. Weber, who in 1847 sent two lots of ore, containing respectively 32 and 14 per cent of copper, to the Revere Copper Company (of Boston). Systematic search for copper began in 1851, and soon great quantities of rich "black" ore rewarded the pick of the prospector. Openings still exist where thousands of tons of ores, averaging from 30 per cent to 60 per cent, were found and dug out at a cost but little more than the mere expense of shoveling.

The surface of the Ducktown District is cut up into quarter-sections and fractions thereof. Almost every quarter was, at one time, the basis of a mining venture, and more than a dozen companies operated simultaneously in the hills.

In the month of September, 1853, the production of seven of the mines reached 808 tons of 28 per cent ore, and the aggregate shipments of eight of the properties, since their commencement, has been 14,291 tons, worth over a million of dollars.

Many of the shipments of ore were made to England, as this was the only manner of realizing on the product. But the danger from the black oxides giving rise to spontaneous combustion, whenever moistened by water, and the necessity of utilizing low-grade ore, soon led to the erection of works for smelting the ore on the spot. In 1854, two blast-furnaces were erected at the Tennessee mine, but were unsuccessful. In June, 1855, Welsh furnaces were successfully started at the Eureka, converting the black oxides into a 54 per cent regulus, which was shipped.

These black oxides are, in reality, not a pure oxide, though so called in miners' phraseology. They derive their color largely from the presence of copper glance, and are an intimate mixture of glance, oxide, carbonate, and sometimes finely divided native copper. Two analyses, by Dr. A. Trippel, show their constituents:

Oxide of copper	5·75	3·80
Sesquioxide of iron	1·50	·63
Sulphur	18·75	25·40
Copper	71·91	41·00
Iron	·93	26·56
Soluble sulphates of copper and iron	·72	1·78
	99·56	99·17

A pile of such ore, laid on a bed of cord-wood and moistened, often ignites the wood below, and thus roasts itself without firing.

In the ruins of the the various old smelters, scattered over the Ducktown District, a veritable history of the progress in copper smelting is written. As already mentioned, Welsh reverberatory furnaces and small blast-furnaces were the first metallurgical plants. The latter had a section about 12 or 15 inches wide by 18 inches deep, with one tuyere at the back. A number of these small blast-furnaces were built into one huge block of masonry. They were charged from the front, and were not over five feet high. Mexican adobe furnaces have about the same dimensions, but are superior in being accessible from all sides.

Improvements were soon made in the building of these furnaces. Separate brick stacks, with replaceable lining of soapstone rock found in the vicinity, became the rule. Two tuyeres, through the back wall, were also introduced. Whenever the lining was cut through by the corroding action of the slags, the furnace was blown out and relined.

About the time of the consolidation of many of the companies into one strong concern, the manager, Mr. A. Raht, led a new departure by building the furnaces with thin walls, strongly bound by railroad iron. A single complete central smelting plant was also established to treat the yellow sulphurets, which now alone remained. The rich black ores had been practically exhausted. With but slight modifications, this plant was in use until the district was finally abandoned several years ago, by reason of the largely increased cost of fuel and the low price of copper. At that time, charcoal was hauled an average of over ten miles, and the supplies of wood were drawn from even longer distances.

Before proceeding to the description of the metallurgical treatment of the ores at Ducktown, a somewhat closer examination of the mines will be convenient.

Ducktown mines can be divided into three parallel ore zones, about one mile apart. Of these, the western zone comprises the East Tennessee mine, the London, Cocheco, and Hiwassee. As has been mentioned, the ore of this zone is slate-ore, and consequently siliceous. The eastern range of the Polk County, Mary, and Callaway mines contain pyrrhotite and yellow copper ore. Comparatively very little siliceous ore is found, and that only at or near the edges of the deposits. The mass of the ore is decidedly basic, and sometimes contains considerable calcite. The accompanying plan of the Mary mine, from surveys made by the writer, gives an idea of the huge size of these deposits. In the cross-cuts, which extend some 70 feet, both walls have not been reached, nor has the end of the deposit been reached by the underground workings. The section deduced from the diamond-drill holes will also be instructive. (See Fig. 7, Plate III.)

The middle or Isabella range of deposits exceeds in size even the Western. A veritable mountain of gossan covers an ore-body penetrated at right angles with its strike for nearly four hundred feet, by a diamond drill-hole, without proving the foot-wall.

Judged solely by their contents in copper, the Eastern Range stands preëminent, the Western next, and the Isabella last.

In 1877, when the bulk of the notes for this paper was collected, mining was prosecuted only at the East Tennessee and Mary mines. Both were connected with the smelter by a 3-foot gauge railroad. During the summer of 1876, the ore shipped from the East Tennessee was mined from the edges of the great mass, which was at that time being rapidly exhausted.

An average of 8 months' shipments of the sorted ore analyzed 5·5 per cent copper; 20 per cent iron; 42 per cent silica; 30 per cent sulphur. The stopes that had been formerly worked in the then exhausted center of the bed, had averaged considerably richer, reaching 7·5 per cent of copper. In the fall of 1876, and in 1877, the last of the bed on which the mine was originally opened was removed, and only occasional rich pillars and scraps of ore remained. These were shipped to the smelter, to serve as flux for the basic Mary ores; an average of sixteen lots assayed 3 per cent copper; 74 per cent silica.

It was about that time that the edge of a new mass was cut, but, like the last of the old bed, it averaged low in copper. Probably upon sinking and thus approaching closer to the center of the new find, richer ore will be discovered.

The usual system of mining pursued at Ducktown was to sink a vertical main shaft, cross-cut to the ore, drift on this, sink winzes connecting with the levels below, and break the ore in the stopes thus opened by underhand stoping. Wages ruled $1.50 for miners, $1.25 for laborers, in 1875 and 1877. Most of the work was done on contract at the following rates:

Sinking main shaft complete, per fathom	$295	Drilling (underhand), per lineal foot	27 cents.
Drifts, per fathom	65	Tramming, per car or ton	5 to 7 cents.
Winzes, per fathom	145	Breaking ore, by ton	$1.

The broken ore was hoisted without assorting and dumped over screens on to a sorting-floor. There it was sorted into three classes, dead rock, stamp-rock, and smelting ore. The last was cracked to fist size by men paid 50 and 75 cents per car of 2 and 3 tons. It was loaded at a cost of 8 and 12 cents a car, and sent to the roast-heaps.

The screened ore and stamp rock were sent to dressing-works. Of these, there were two supplied by rock from the East Tennessee mine. Both were operated by water-power.

The East Tennessee works were an old 7-stamp wooden battery of about 400 pounds, operated by an overshot water-wheel. Concentration of the stamped rock was effected by a Cornish tye and several buddles. From 18 to 20 tons concentrations were produced per month, assaying from 6·2 per cent to 6·9 per cent metallic copper, and 30 per cent insoluble residue. The tye tailings analyzed 2·1 per cent; buddle tailings, 1·2 per cent.

The unsatisfactory results of these works led to their abandonment in 1876. At the Isabella dressing-works, much better and cheaper work was accomplished. The plant consisted of a rock-breaker, discharging through a revolving screen with 1¼-inch holes, on to a revolving picking-table. The screenings passed to coarse power-jigs, and the tailings from these, together with the rejected ore from the picking-table, were automatically fed into a 600-pound 10-stamp battery of modern build. The battery crushed the ore through 10-mesh screens and fed a spitzkasten, which, in turn, fed 3 sand-jigs running at 160 revolutions a minute, and a revolving buddle.

In the summer of 1875, stamp-rock sent to this mill averaged 2·3 per cent copper; the picked ore from the table, 7·3 per cent; the coarse

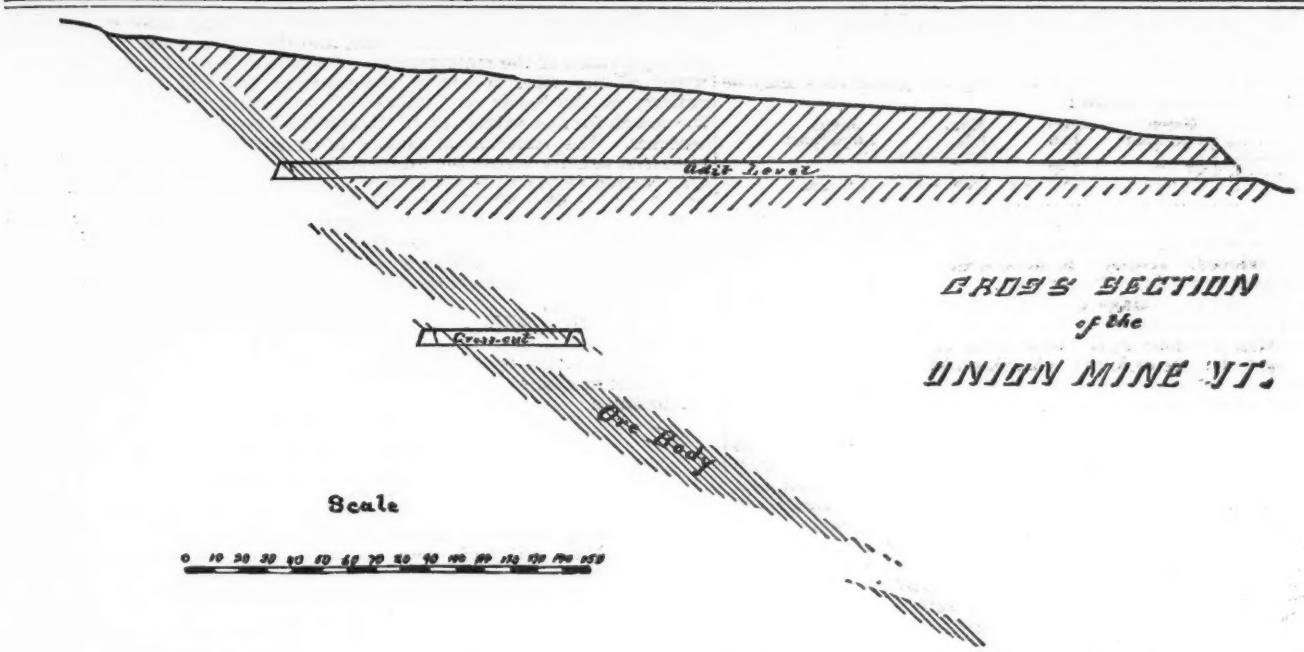


Fig. 3.

Fig. 1.—Pyrites Deposits of Röoras.

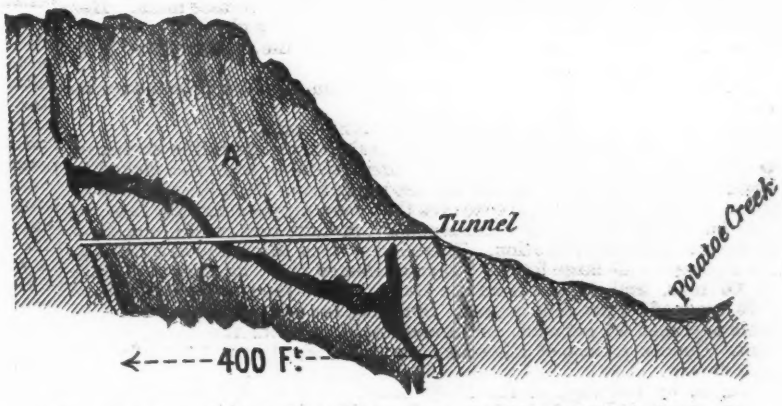
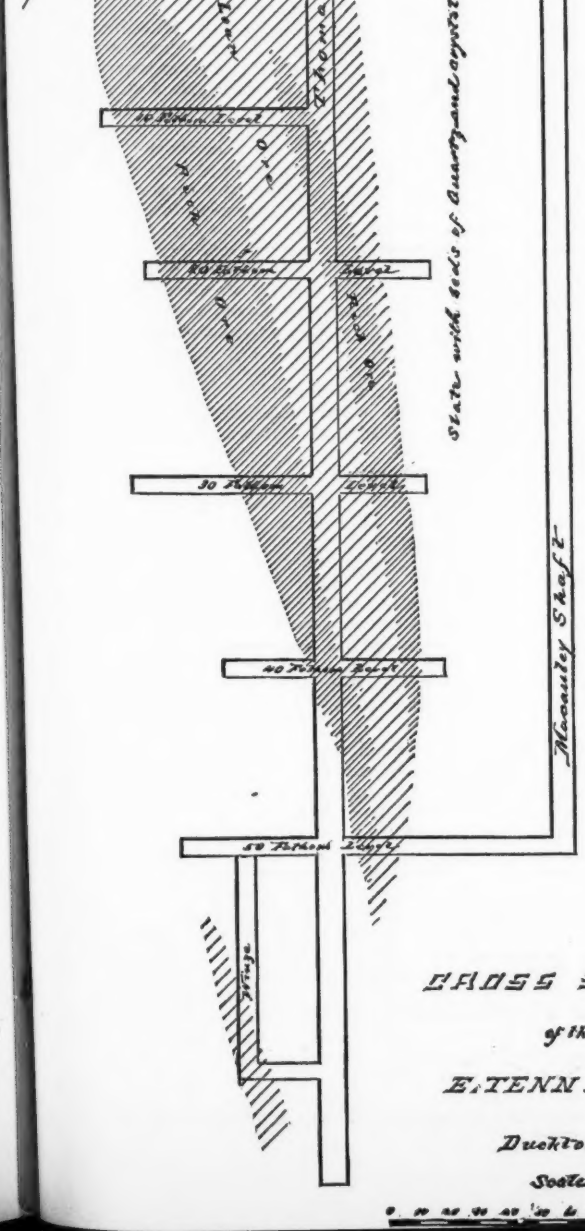
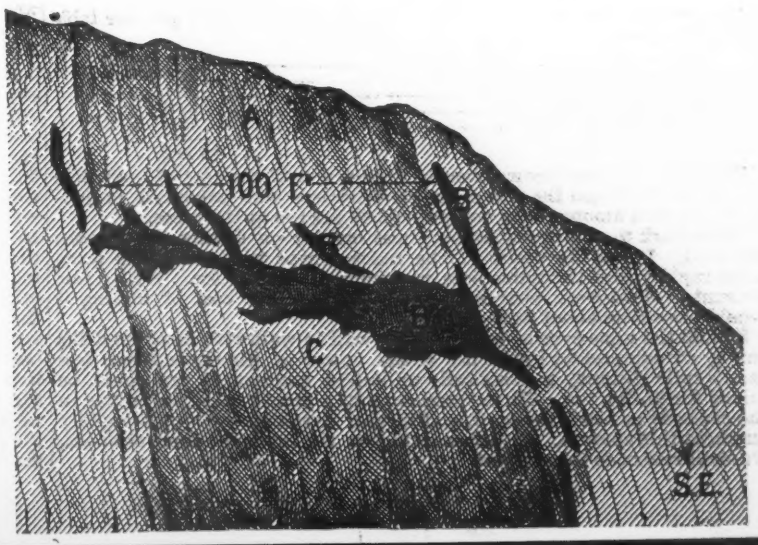


Fig. 5.—A, Decomposed Ore or Gossan. B, Rich Oxidized Ores. C, Decomposed Yellow Pyrites.





jigged ore, 6·9 per cent; the hutch from these jigs, 6·4 per cent. With 3 per cent stamp-rock, the works have produced as high as 110 net tons ore, averaging from 10 to 12 per cent per month.

The results of a few months' work on very low-grade rock may be interesting, and are tabulated below:

1876.	March.	April.	May.	June.
Rock assay.....	2·1 per cent	1·96	1·75	1 0 per cent
Concentration....	9·1 "	9·3	9·2 per cent	6·4 "
Tailings....	0·67 "	0 68	... .	.....
Product.....	45 tons	50 3 tons	53·9 tons	48·3 tons
Cost.....	.....	.....	$222.39	$182.61

As before stated, the works were operated by water-power derived from an overshot wheel. All employés at the mill were paid by the unit per ton of ore produced. To check waste, a deduction was made if the tailings assayed over two thirds of 1 per cent.

Considering the low percentage of the stamp-rock, the above results are certainly eminently satisfactory. The concentrated ores were usually accumulated during the month, to allow them to partially drain; yet even after the lapse of three or four weeks, they still retained from 8 to 10 per cent of water. That amount did not, however, interfere with the roasting of the ores in the usual manner.

Mining on the Mary mine was conducted on a system similar to that pursued at the East Tennessee, but the nature of the ore-body rendered some important deviations from the usual practice necessary. A rich streak of ore was generally found running along the hanging-wall, and this alone was mined. The hanging was well defined and usually of quartz. Between the quartz and slate country, a gouge was occasionally found. No attempt was made to mine the whole width of the ore-body, as at the East Tennessee mine; for the vast mass of the ore lying on the foot-wall was uniform and low grade throughout, so that sorting to materially increase the percentage was an entire failure. As a consequence, it became necessary to abandon the major portion of the ore-bed and mine a comparatively narrow zone of ore. This zone was both richer in copper and silica, and it alone was mined and sent to the cobbing-floors.

The following average samples of this ore clearly show its composition:

	A	B	C
Silica.....	6 0	12 0	19·30
Copper	5·0	3·5	5 83
Iron.	36 0	46·9	38·70
Sulphur	35·0	29·9	31·60
Alumina	....	3 0	1·70
Magnesia	....	....	0 86
Lime.....	6·0	3·0	1·21
Carbonic acid etc.....	....	....	1 13

Sample A, by the writer. Sample B, taken and analyzed by Torrey & Eaton. Sample C, by Dr. E. D. Peters.

Other average samples by the writer were as follows: Average of 15 months' shaft smalls (that is, the ore broken fine under ground, and which should give a very fair average of the whole mass), 5·4 per cent, varying from 4·4 per cent to 6·9 per cent.

The cars loaded in the stopes of the Mary mine were run out on to the cage, hoisted, and then trammed outside of the mine, and tipped on sorting-floors; a counterpart of those of the East Tennessee mine. Here the ores were broken, and sorted or culled into three classes.

1st. Rich smelting ores, shipped directly to the smelter after being cracked to usual size.

2d. Mundic or low-grade ore, principally iron pyrites, thrown over the dump.

3d. Siliceous ores, sent to the Mary dressing-works.

These works are a counterpart of the Isabella, except in the absence of coarse jigs. The ore sent over the dressing-table was hand-picked by boys, as at the East Tennessee; but the waste from the table was divided into two classes: First, siliceous ores that were dropped directly into the feed-hopper of the stamps; and secondly, mundic ores, which could not be enriched by concentration. These latter were thrown over the dump. An average of 43 large lots of "coarse selected ore," aggregating some 10,000 tons, and shipped from the Mary mine to the smelter in 1875 and 1876, assayed 5·9 per cent copper. Smelting ore selected on the picking-table averaged 6·1 per cent, and mundic tailings from the same, 4·3 per cent. Concentrations of siliceous Mary ore assayed from 5 9 to 6·8 per cent copper. The tailings assayed 0·4 per cent copper.

Wages, by the day, at the Mary mine, were $1 and $1.25, but the miners earned at least 25 cents a day in addition by working on contract. The usual prices paid were as follows:

Drifts.....	$75 per fathom	Culling.....	8¾ cents a ton
Winzes.....	125 "	Inch drilling for dry back holes.....	3 cents
Small shafts.....	175 "	For cutting in holes.....	2½ "
Trammers.....10 cents a car, under ground		For underhanded holes....	2 "
Trammers in the adit. ...	5 cents a car		
Loading.....	8 cents a ton		

The average cost per ton of 11,561 tons of ore broken as per the table was as follows:

Ore breaking.....	68·8 cents
Tramming, hoisting, and landing.....	38·5
Culling and cracking.....	20·0
General expenses.....	20·2
Dead-work.....	71·0
	$2.18·5

The ore wasted or thrown over the dumps was 37 per cent of the whole quantity mined, and the cost of the smelting ore was enhanced proportionately, and amounted to not quite $3.47 per ton at the mine.

Dead-work to an unusual amount was carried on during the months recorded. It was the desire of the management to develop the mine more rapidly than the immediate requirements called for. With a fair amount of dead-work charged against the ore, the cost of mining it would have been about $1.75 a ton.

Should the mine ever be worked from wall to wall with machine drills run by air compressed by the use of the power of the Ocoee River (less than a mile distant), a practically unlimited amount of ore could be mined for $1.25 a ton. Three thousand tons a month could be broken in the ore-body as now developed, and further development would rapidly augment this amount. In commenting on the future of these ore-beds, we shall return to this subject.

The East Tennessee and Mary mines were the only ones operated in 1876 and 1877 on a considerable scale, and they were under the immediate supervision of the management. Ore was obtained by purchase from many of the other mines of the district; but this mining was left entirely in the hands of "tributers," who confined their attentions to the search for and extraction of "black ores" not removed by the former workers. The contents in copper of these ores varied greatly, but remained usually within the limits of from 6 to 12 per cent. They invariably carried from 6 to 10 per cent of moisture, and always were siliceous, carrying from 60 to 80 per cent of silica.

A supply of these ores was a welcome addition to the produce of the mines. They formed excellent flux, and were treated together with roasted first matte in smelting for black copper.

Smelting at Ducktown comprised the following six operations:

1. Ore roasting.
2. First matte smelting.
3. Matte roasting.
4. Matte smelting for black copper.
5. Blister smelting.
6. Refining.

(TO BE CONTINUED.)

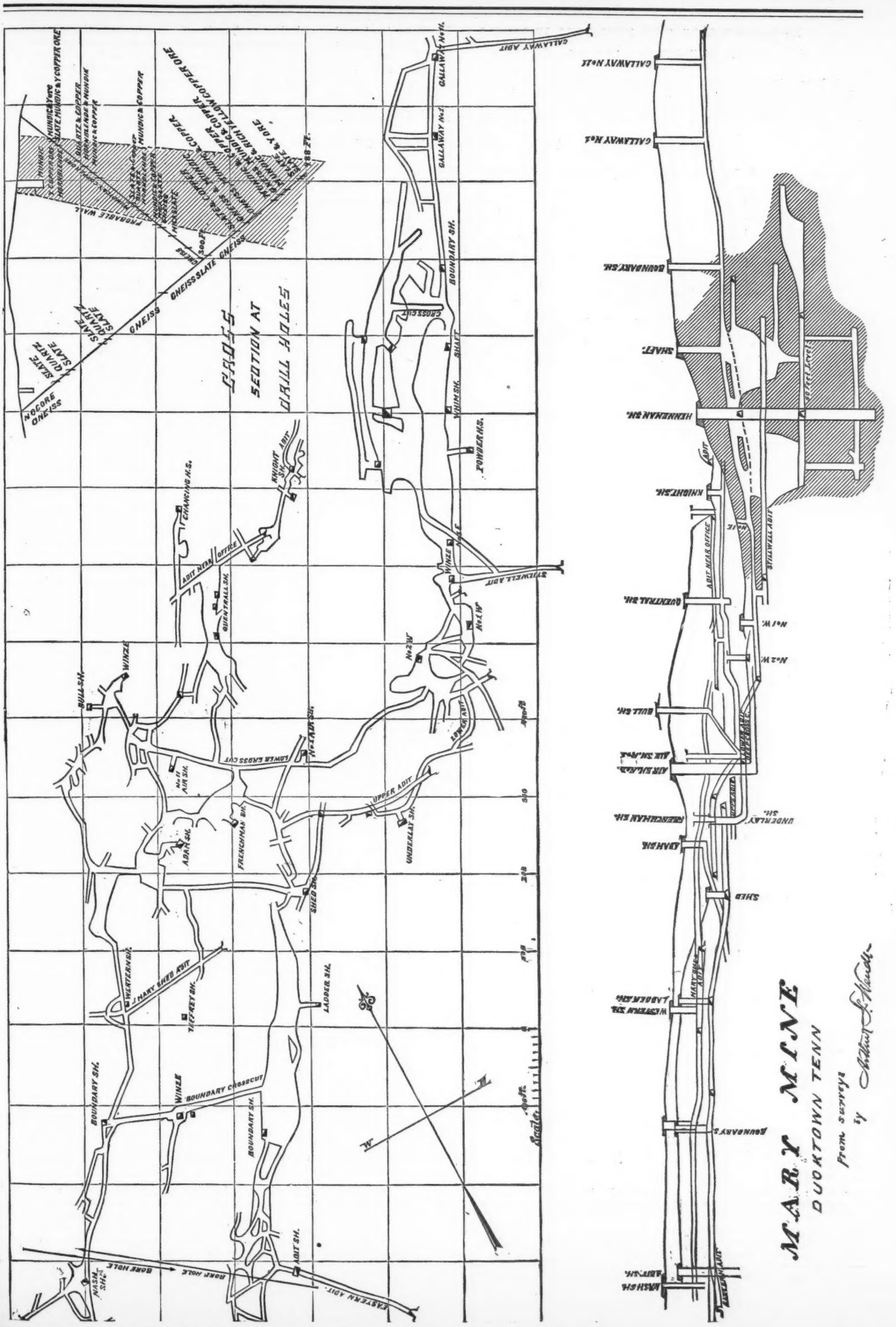
EMERY MINES OF ASIA MINOR.

From the report of Consul Stevens, of Smyrna, we learn that the principal emery mines of Asia Minor are confined to the districts of Thyra and Aidin, although emery stone is found in nearly all parts of Asia Minor, and not unfrequently in the remote and almost inaccessible regions of the interior, where the natural obstacles are too great to offer any inducement to the miner. The most important mines in the district mentioned are the Tchavus, the Hassan Tchavuslar, the Aladjali-Tchiflik and Kourchak, the Halka, the Akdere, and the Gurnush Dogh. There is another mine near Milassa, the stone from which is brought for shipment to a place on the coast called Kuluk, near the Gulf of Mendalio, and is either shipped directly from that place to foreign markets or brought to Smyrna in small sailing craft for reshipment. When well picked and freed from unsound ore and rubbish, the emery from the Tchavus, Hassan Tchavuslar, and Aladjali-Tchiflik mines is of good and nearly equal quality. The Akdere stone is not so much sought after, while that excavated near Milassa, the largest part of which finds purchasers in the United States, is of inferior quality, the grain being smooth, and a considerable quantity of magnetic iron entering into its composition. The amount of stone annually shipped from Smyrna to Great Britain, the United States, France, Germany, and Belgium averages 7000 tons, the relative quantity consumed in each country being in the order named.

The process of extraction is as follows: The mines are opened by wells and galleries, and the stone is obtained in most instances by blasting, gunpowder and dynamite being freely used to extract it from between blocks of marble or masses of granite. The overseers and principal workmen at the mines are Italians, who are paid at the rate of 3s. 6d. a day, while the native workmen only receive about half this amount. The emery is picked daily at the mines as fast as it can be extracted, in some cases not one half the quantity being selected. It is then conveyed by camels to the nearest railroad station, and thence to Smyrna, where it is generally picked again previous to shipment. When the mines are situated on hights inaccessible to camels, the ore is brought down to the plains by donkeys, and, if the pieces are too large to be carried by camels, they are brought to the station in carts drawn by buffaloes. The mines are worked upon the strength of concessions termed *firmans*, granted by the imperial government for a period usually of ninety-nine years, or, in cases where the emery has been found on *nacouf* property—that is, property belonging to the Turkish religious institutions—by special permit of the department at Constantinople that administers the *nacouf* estates and exacts payment to them of so much per quintal. A *firman* or concession during the period it is in force can be sold, transferred, and transmitted by inheritance, like other property, in Turkey, provided due notice be given by the Department of Mines at Constantinople, and authorization formally obtained.

The Indian Engineer.—This is the name of a new professional bi-monthly journal published in Calcutta (No. 4 Dalhousie Square). India offers a magnificent field for engineering, and, judging from the subjects treated of in the first and second numbers of this new journal, it appears to offer an equally good field for a professional periodical. It is indeed strange that India, with all its great public works and rapid development of railroad, water-works, irrigation, and manufacturing industries, has not possessed an engineering journal. The *Indian Engineer* promises to supply this want in a highly creditable and useful manner. No doubt its pages will afford our American manufacturers a means of introducing their wares to this wide and promising field.

Snelus on Cost of Steel Rails.—Mr. G. J. Snelus, presiding at a dinner of the Royal School of Mines, in London, recently, said that since 1872 the English mining and metallurgical industries had been getting worse. In that year, they sold steel rails at from £16 to £18 a ton. German, Italian, and Belgian manufacturers were now competing at £3 12s. 6d. a ton, and English manufacturers were compelled to compete with these competitors at a similar price. The wages for ingot-making in 1872 were 21s.; in 1886, 3s. In 1872, the wages for rail-making were 20s.; in 1886, they were 6s. If Germans and Belgians could compete with us at these low prices, he thought there was something wrong if the English manufacturers could not compete with them and beat them. He had told his workmen that, if England was to maintain its industrial position, they must do as the Germans and the Belgians did. The workmen must accept lower wages and live more economically, and masters must use better science and turn out better work in order that the workmen might live more cheaply. When they began to make steel rails, it cost nearly 30s. to make the ingot. Now they were making it at 3s. a ton, and the rails at a little over 5s. a ton, owing to the very great improvements in the machinery. Notwithstanding this, the Americans and Germans were more successful than we were.


SECTION AT EAST END
SECTION AT WEST END
GALLAWAY ADIT
GALLAWAY No.1
GALLAWAY No.2
BOUNDARY SH.
CROSS CUT
SHAFT
VOHM SH.
POWDER HS.
KNIGHT ADIT
KNIGHT SH.
CHANGING H.S.
ADIT NEAR OFFICE
OFFICE
QUERTRALL SH.
WINZE
STILWELL ADIT
JACOB
JACOB
BULL SH.
LOWER CROSS CUT
No.1 AIR SH.
ADAM SH.
FRENCHMAN SH.
UPPER ADIT
UNDERLAY SH.
SHED SH.
LADDER SH.
WESTERN SH.
HARRY SHED ADIT
TEE-KEY SH.
BOUNDARY CROSSCUT
BOUNDARY SH.
WINZE
ADIT SH.
EASTERN ADIT
BORE HOLE
NASH SH.
NASH ADIT
GALLAWAY No.1
GALLAWAY No.2
BOUNDARY SH.
SHAFT
HENNEMAN SH.
KNIGHT SH.
ADIT
STILWELL ADIT
QUERTRAL SH.
No.1 W.
No.2 W.
BULL SH.
AIR SHAFT
AIR SHAFT
FRENCHMAN SH.
UNDERLAY SH.
SHED
ADAM SH.
WESTERN SH.
LADDER SH.
BOUNDARY S.
NASH SH.
ADIT SH.
MARY ANN ADIT
MARY ANN
Scale 100 ft.
MARY MINE
DUCKTOWN TENN
From surveys
by

EXPERIMENTS MADE WITH STEEL RAILS IN RUSSIA.*

By M. Beck-Guerhard, St. Petersburg.

It is now ten years since the manufacture of steel rails was begun in Russia. The development of the trade has been rapid and considerable. There are at present eight works manufacturing steel rails throughout the empire, two being at St. Petersburg, two in Poland, one in the center, one in the south, and two in the Ural. These eight works have a united production of over 200,000 tons of rails a year, which is a quan ity calculated to be rather in excess of the actual requirements of the country. Both Bessemer and Siemens steel are used in the rail manufacture, the works in question also producing fastenings, tires, axles, bars and plates, etc., for shipbuilding. In 1877, the Ministry of Ways and Communication issued certain instructions in reference to the testing of steel rails. The tests determined upon have already been printed in our proceedings.* The severity of the Russian winter and the great variations of temperature determined the department having charge of this subject to order that it was desirable that in the manufacture of steel rails care should be taken to have them sufficiently mild. The following test prescribed, namely, 30 poods = ½ ton, from 7½ to 8½ feet, according to section, was fixed as the regular test for rails' which were to be previously frozen in a mixture of ice and salt to a temperature 12 degrees R. The softness of the rails was to be determined by testing under a press, a permanent set of one mm. being prescribed under a weight that rose or fell according to the section. Under these circumstances, the Russian steel-works undertook the production of rails of a milder description than the rails generally

TESTS OF STEEL RAILS IN RUSSIA.

Weight that has Passed Over Rails	Condition of Rail when Taken Up	Average Weight per Axle of the Locomotives	Number of Months of Service	Mechanical Tests under Falling-weight of Half-ton						Chemical Composition of Rails					
				Deflection in mm.		Elongation, Per Cent.	Contraction, Per Cent.	Limit of Elasticity	Breaking Strain	Angle of Torsion	C	Mn	C. + Mn	Si	Ph	Si. + Ph
Poods				First Blow	Second Blow			sq mm	sq mm							
49,064	Head worn out	12·50	7	34	65	21·1	41·4	—	—	—	0·237	0·9064	1·1434	0·0320	0·0882	0·1202
49,064	— — —	12·50	7	33	62	14·6	23·6	—	—	—	0·260	0·6381	0·8981	0·0093	0·1151	0·1244
398,382	Head crushed	12·50	27	—	—	16·7	38·7	24·15	54·93	8° 32′	0·180	0·1848	0·3643	0·0202	0·1631	0·1833
434,191	Broken on the slipper	12·40	33	—	—	6·6	9·0	31·57	59·04	4° 15′	0·330	0·2100	0·5100	0·1897	0·1387	0·3284
1,041,231	Broken between the slippers	12·50	74	30	63	22·3 19·5	43·8 46·6	18·95	54·31	7° 29′	0·260	0·2904	0·5504	0·0171	0·1089	0·1260
1,162,251	Broken between the slippers	12·50	84	27	—	23·0	42·0	22·62	63·98	6° 26′	0·250	0·5984	0·8494	0·0591	0·1262	0·1853
1,167,108	Head crushed	12·50	85	26	52	18·5	35·0	32·04	77·22	5° 5′	0·200	0·5368	0·7363	0·2054	0·1117	0·3171
1,180,710	Broken on the slipper	12·50	87	—	—	12·0	31·2	30·94	68·20	5° 27′	0·290	0·6204	0·9104	0·2924	0·1240	0·4164
29,716	Head worn cut	12·50	7	32	64	24·6	51·3	19·44	54·00	11° 56′	0·230	0·8616	1·0916	0·0204	0·1307	0·1511
1,201,661	In good condition	12·50	90	22	48	7·2	6·2	28·06	59·21	3° 11′	0·350	0·3785	0·7285	0·0342	0·1575	0·1917
1,175,004	Sound, no defects	12·50	88	21	—	18·4	42·6	30·17	67·89	7° 50′	0·340	0·8974	1·2374	0·5491	0·1390	0·6881
1,169,714	Sound, no defects	12·50	85	26	50	19·1	36·5	21·00	59·12	7° 33′	0·410	0·6902	1·1002	0·0918	0·0793	0·1711
112,741	Broken	—	54	—	—	23·8	55·6	30·46	64·31	7° 47′	0·160	0·8080	0·9690	0·4589	0·1463	0·6052
30,764	Broken	—	22	29	67	24·8	59·2	24·69	55·46	9° 3′	0·110	0·7040	0·8140	0·4200	0·1463	0·5663
125,148	Broken	—	58	31	58	22·1	46·7	22·10	56·84	5° 47′	0·420	0·3652	0·7852	0·0540	0·1508	0·2048
103,535	Broken	—	51	—	—	23·5	56·6	31·57	60·31	6° 36′	0·170	0·9768	1·1468	0·4822	0·1385	0·6207
94,335	Broken	—	48	—	—	19·8	58·0	22·22	56·16	7° 24′	0·120	0·3360	0·4560	0·4933	0·1463	0·6396
7,000	Broken	5·50	32	22	—	19·7 20·5	49·6 38·4	19·61	45·30	9° 0′	0·340	0·3641	0·7041	0·0289	0·0716	0·1005
9,000	Broken	5·50	48	—	—	21·0 22·6	43·3 42·9	18·06	50·75	5° 16′	0·420	0·4001	0·8201	0·0233	0·0625	0·0858
3,000	Sound, no defects	5·50	10	38	71	23·6	38·9	19·91	53·36	7° 8′	0·340	0·5948	0·9348	0·0420	0·1033	0·1453
3,000	Sound	5·50	10	52	90	23·1	40·2	18·10	48·28	10° 32′	0·220	0·5948	0·8148	0·2330	0·0754	0·3084
460,000	Sound	11·79	90	—	—	4·1	7·6	26·84	61·25	4° 24′	0·360	0·3696	0·7296	0·0964	0·1810	0·2774
400,000	Broken	11·79	82	—	—	17·5	44·9	21·60	53·69	5° 41′	0·250	0·3960	0·6460	0·1757	0·1507	0·3264
400,000	Longitudinal crack in the head	11·79	81	35	—	19·2	45·8	25·89	54·62	7° 9′	0·220	0·2288	0·4488	0·0311	0·1798	0·2109
3,000	Broken	11·79	1	38	72	19·4	53·8	15·88	42·99	10° 50′	0·160	0·3080	0·4680	0·0155	0·0949	0·1104
27	Broken in winter, 15° cold	6·38	1	—	—	24·8 7·2	44·1 7·1	21·72	54·95	6° 8′	0·190	0·6417	0·8317	0·0062	0·2681	0·2743
71	Broken in October at + 4°	6·25	—	—	—	24·6	44·1	27·05	63·84	7° 1′	0·220	0·9255	1·2065	0·0093	0·3334	0·3427
25	Broken	6·25	2	33	—	22·4 19·7	54·9 53·5	21·16	54·73	8° 13′	0·240	0·4939	0·7339	0·0171	0·3183	0·3354
737	Greatly damaged	6·25	41	23	56	22·2	59·9	—	—	—	0·230	0·9898	1·2198	0·0342	0·6698	0·7040
985	Slightly damaged	6·25	54	28	55	13·5	19·1	23·08	51·93	6° 17′	0·230	0·6237	0·8537	0·0124	0·2435	0·2559
1.045	Sound	6·38	60	34	63	20·3	43·2	19·91	49·88	6° 4′	0·520	0·3476	0·8676	0·1508	0·0866	0·2374
383,708	Broken	—	39	—	—	10·5	16·5	19·75	42·86	5° 56′	0·190	0·2520	0·4420	0·0062	0·2625	0·2687
549,801	Broken	—	54	—	—	14·6	53·1	20·21	54·37	14° 30′	0·270	0·9265	1·1965	0·1508	0·2413	0·3921
57,402	Sound	—	56	37	70	14·0 17·5	37·1 57·9	22·63	54·09	11° 42′	0·130	0·2520	0·3820	0·0062	0·1704	0·1766
567,099	Broken	—	57	30	—	14·8 17·5	42·2 53·8	23·98	54·19	11° 58′	0·140	0·3240	0·4640	0·2020	0·2178	0·4198
607,095	Sound	—	58	—	—	5·5	13·7	14·84	25·57	5° 34′	0·100	0·1800	0·2800	0·0031	0·2793	0·2824
580,527	Broken	—	65	32	61	17·3 14·1	29·3 40·2	22·93	51·29	6° 54′	0·160	0·3462	0·5062	0·0016	0·2425	0·2471
662,067	Sound	—	56	—	—	15·7	47·5	22·93	56·11	7° 52′	0·150	0·1914	0·3414	0·0062	0·3373	0·3435
367,440	Broken	—	38	32	60	14·8 21·6	48·3 48·1	19·04	53·69	7° 35′	0·330	0·6732	1·0032	0·0535	0·0849	0·1384
331.644	Sound	—	44	23	45	15·1	38·7	32·28	78·44	7° 21′	0·420	0·3218	1·7488	0·1275	0·0977	0·2252
551,238	Broken	—	54	19	34	12·4	28·1	33·31	80·13	5° 57′	3·540	0·3476	0·8376	0·0840	0·1218	0·2058
567,597	Broken	—	57	36	67	16·5 17·3	30·8 39·9	20·52	52·74	4° 36′	0·270	0·5280	0·7930	0·0248	0·0659	0·0907
449.579	Sound	—	64	38	70	6·8	13·6	23·68	45·26	3° 40′	0·230	0·5016	0·7316	0·0093	0·0894	0·0987
364,023	Sound	12·00	70	34	63	18·0	42·3	18·10	54·91	3° 55′	0·400	0·5104	0·9104	0·0264	0·1229	0·1493
364,023	Sound	12·00	70	37	67	21·8	44·6	18·31	55·25	6° 24′	0·310	0·6644	0·9744	0·0575	0·1134	0·1709
364.023	Sound	12·00	70	35	65	17·8	26·2	24·07	52·54	4° 32′	0·290	0·4708	0·7608	0·0342	0·0894	0·1236
361,000	Broken	—	63	30	60	19·4	50·6	24·07	57·40	6° 35′	0·230	0·5324	0·7624	0·1042	0·2234	0·3276
321,000	Broken	12·00	69	36	73	24·6	58·6	21·15	54·94	8° 59′	0·130	0·3476	0·4776	0·0840	0·1218	0·2058
224,000	Broken	11·47	24	24	—	19·9 18·9	45·8 46·9	25·26	64·16	4° 47′	0·250	0·4400	0·6900	0·1524	0·1022	0·2546
278,000	Broken	11·47	29	28	55	20·2 21·1	49·9 51·7	20·07	52·18	6° 31′	0·250	0·3927	0·6427	0·0535	0·0985	0·1524
28,000	Broken	11·47	3	—	—	10·9 1·5	33·7 0·0	18·71	54·66	3° 11′	0·340	2·0328	2·3728	0·0062	0·2167	0·2229
200,000	Head flattened	11·47	20	42	75	15·5	56·9	20·83	57·91	20° 35′	0·120	0·7920	0·9120	0·0031	0·0955	0·0986
670,000	Head worn out	11·47	84	—	—	13·5	51·7	23·05	56·24	8° 13′	0·810	0·5236	0·7336	0·1742	0·0748	0·2490
630,000	Broken	10·43	91	24	50	19·2 18·8	42·9 44·6	20·84	58·35	3° 23′	0·280	1·0296	1·3096	0·6177	0·1145	0·7332
690,000	Broken	10·43	103	25	48	18·2 4·6	43·7 —	23·69	64·44	5° 35′	0·280	0·7040	0·9840	0·1244	0·0877	0·2121
46,000	Broken	10·43	8	22	—	17·8 14·8	40·8 32·2	22·66	67·52	6° 53′	0·450 0·490	1·2656 1·2746	1·7156 1·7646	0·0715 0·0731	0·1763 0·1899	0·2483 0·2830
47,000	Broken	10·43	7	—	—	16·6 20·2	27·5 48·8	24·69	58·94	7° 42′	0·260	0·4840	0·7440	0·1524	0·1050	0·2574
450,000	Head damaged	10·43	63	29	55	20·5	32·2	19·58	55·61	6° 48′	0·350	0·5280	0·8780	0·0202	0·0894	0·1096
80 000	End damaged	10·43	12	30	56	18·8	38·7	20·21	53·68	7° 27′	0·220	0·1584	0·3784	0·0420	0·0754	0·1174
600,000	End damaged	10·43	86			6·6	6·2	26·52	83·27	5° 59′	0·630	1·1440	1·2740	0·0264	0·1151	0·1415
230,000	Sound	10·43	36	28	55	20·6	48·4	18·00	66·31	11° 50′	0·31	1·408	1·7180	0·1550	0·0977	0·2527
700,000	Sound	10·43	105	29	54	18·2	40·2	22·42	58·40	7° 18′	0·27	0·3652	0·6352	0·0264	0·0826	0·1090
600.000	Sound	10·43	72	25	50	19·6	41·4	26·21	65·36	7° 35′	0·35	0·9680	1·3180	0·0637	0·0894	0·1531
240,000	Head damaged	9·98	49	28	55	19·5	48·0	24·23	59·12	4° 34′	0·28	0·4664	0·7464	0·1306	0·1234	0·2540
20,000	Broken	9·83	6	29	54	16·7	35·5	25·26	56·58	5° 21	0·23	0·4752	0·7052	0·1698	0·0866	0·2564
—	Sound	—	204	—	—	16·9	48·3	22·62	53·31	6° 47	0·28	0·5368	0·8168	0·0140	0·0782	0·0922
—	Sound	—	108	—	—	18·2	37·7	—	—	—	0·29	0·5016	0·7916	0·1057	0·1016	0·2073
—	Sound	—	60	29	55	11·4	19·0	20·37	61·72	5° 27′	0·39	0·4180	0·8080	0·0140	0·0625	0·0765
—	Broken	—	96	26	—	20·4	48·0	28·41	55·24	3° 8	0·25	0·4620	0·7120	0·0651	0·1205	0·1857
—	Broken	—	60	33	62	9·8	20·6	22·62	50·40	3° 59′	0·25	0·2288	0·4708	0·0264	0·0804	0·1068
—	Sound	—	104	22	48	18·7	39·3	23·15	57·72	7° 46′	0·26	0·7954	1·0564	0·0280	0·0637	0·0917
—	Broken	—	92	—	—	11·8	15·0	18·09	47·67	4° 45′	0·29	0·5808	0·8708	0·0233	0·0648	0·0881
—	Sound	—	168	31	64	22·6	51·4	16·42	53·68	7° 58′	0·32	0·4444	0·7644	0·0124	0·0531	0·0655
—	Broken	—	54	36	62	5·2	7·7	26·25	55·82	3° 21′	0·29	0·4224	0·7124	0·0077	0·0559	0·0636
—	Sound	—	58	34	71	21·1	46·9	28·40	65·24	5° 59′	0·59	0·4400	0·8300	0·0187	0·0614	0·0801

* A paper read before the British Iron and Steel Institute, May 14th, 1886.

* See the Journal of the Iron and Steel Institute, No. I., 1883, p. 468.

manufactured abroad. It was found that rails so produced from soft steel resisted the influence of a low temperature better than the rails manufactured from steel of a harder description, and the result has been that broken rails have not been nearly so frequent, even in the severest frost, as they were a few years ago, when the steel made use of was harder.

Notwithstanding what seemed to be the obvious advantage of using softer steel for rails that were intended to resist great variations of temperature, it was discovered by the Russian Railroad Administration that a number of the rails produced from the soft ingot metal gave way after a very limited period of service. This defect was to some extent explained by having too short ends cut off the bar, leaving the extremities hollow, or by the use of too heavy locomotives, or by inadequate ballasting; and to meet these several difficulties, and others that came under their notice, the Russian railroad engineers considered whether it would not be advisable to somewhat increase the hardness of the rails used in the permanent way. With the view of furnishing data for the determination of the problem just stated, the Imperial Technical Society undertook to carry out a series of experiments on the wear of rails, relative to their hardness, on something like the lines that were adopted by Dr. Dudley in his well-known investigations on behalf of the Pennsylvania Railroad. For this purpose, the Russian Technical Society appointed a special commission of experts from their own body, which issued to all the Russian railroad administrations a circular letter requesting to be furnished with samples of rails not shorter than 10 feet in length, as well as tires of both Russian and foreign make, with a description of each specimen submitted, giving, among other facts, the following: 1. The works at which the rails were manufactured, and the date of their manufacture; 2. the date at which the rails were laid down; 3. the form of rails and their original weight; 4. the average weight of each locomotive axle; 5. the tonnage that had passed over the rail; 6. the weight of the rail after removal from the permanent way; 7. the condition of the rail when so removed, as whether broken, flattened at the ends, cracked, or otherwise; 8. the position of the rail in the permanent way, as whether placed on a straight line or a curve, outside or inside, etc.; 9. the description of the fracture or breakage; and 10. the number of months during which the rail had been in service.

For locomotive tires, the particulars required were: 1. The works at which they were produced; 2. their original thickness; 3. the number of kilos traveled before the first turning; 4. their estimated weight and thickness.

In response to their invitations, the Commission received 150 samples of rails of all kinds, and 113 samples of tires, from which they selected 107 rails and 44 tires, for the purpose of being tested. The experiments were conducted in the following way: 1. From each sample short pieces were cut off and turned for mechanical testing, made at the official laboratory of the Russian Institute of Civil Engineers; 2. from the same sample, turning chips were taken and analyzed under the superintendence of the Professor of Metallurgy at the School of Mines, at the official chemical laboratory; 3. the remaining length (not shorter than 7 inches) of each sample was tested at the Steel-Works, St. Petersburg, under the inspection of Messrs. Beck-Guerhard and Anitchkoff, under the press and by the falling weight. The last test was performed on rails having at least – 12 degrees R., the supports being on a solid cast-iron anvil of 20 tons. All possible measures were taken to avoid mistakes, and all the tests were made with the greatest care, so that there can be no doubt about the correctness of the results. Examining the tables, it is not easy to deduct from the figures positive rules or conclusions, as many of the facts obtained are quite contradictory. This fact shows that, apart from the chemical composition, there are many other partly unknown factors that have great influence on the character of steel rails. But still, a practical result appears to have been obtained, and a meeting of railroad engineers and rail-makers, called by his Excellency the Minister, after examining the labors of the Commission, resolved that the government rules and instructions then existing, determining the character of the steel, were to be so changed as to allow the rails to be made a little harder, and for this purpose a diminution of number and hight of blows, and of the pressure under which the permanent set must be = 0, were proposed and submitted to the Minister of Ways and Communication.

The Ritter Perspectograph.—At the soirée of the Royal Society, the perspectograph of Mr. H. Ritter was shown in action. According to *Engineering*, this is an apparatus for drawing the perspective outlines of buildings and engineering structures, and thus obviating the use of a skilled perspective draftsman. Moreover, it does so without the paper requiring to be covered with construction lines as in the ordinary hand method. It is available for any kind of perspective views, interiors, exteriors, bird's-eye views, and so on; and it puts round or elliptic buildings as easily as square objects into perspective.

The Sargent Rock-Drill on the Croton Aqueduct.—This new drill is apparently forcing its way into prominence by the good work it is doing. Mr. F. W. Dashe, Superintendent of Sections 13 and 14 of the new aqueduct tunnel, has had the Sargent drill in use at shafts 29, 30, and 31, and reports the average work done per shift at shaft 31, with a 3½-inch drill, from 50 to 60 feet in heading in 7 hours, and he claims its superiority over other drills in the matter of repairs and in speed in driving. Mr. Dashe speaks in the very highest terms of the new Sargent device for regulating stroke.

Thermometers for White Heat.—Messrs. Heisch and Folkard have devised some new thermometers with platinum or porcelain bulbs, by which very high temperatures, even those of a white heat, can be measured without having to resort to an expensive or troublesome pyrometer. The reading is taken in precisely the same way as at present with an ordinary thermometer, but the result is obtained by the pressure of air inclosed in the bulb, which is exposed to the heat. This pressure acts directly on a vertical column of mercury. The bulb is hermetically sealed, and the instrument is unaffected by changes in the hight of the barometer.

The Polarity of Tadpoles.—The following, says the *Centralblatt für Elektrotechnik*, is reported about an interesting experiment of the physiologist, Prof. L. Herman. In a flat bowl filled with water, in which a number of 14-days' old frog-larvæ (of *rana temporaria*) were disporting themselves, were sunk along the narrow side ready for an experiment thick zinc wires connected with a battery of 20 little zinc carbon elements. When the current was made, the whole of the little animals fell into a wriggling motion, which soon ceased. But all the larvæ without exception had taken up one position, in which the head was turned to the anode and the tail to the cathode. The animals remained in this position till the current was again broken, when they again fell into the wriggling motion, but now less violently. Repeated experiments proved that the living animals showed a decided polarity, placing themselves along the stream lines of a current with their heads all in one direction, this direction being reversed when the current was reversed. An explanation of this interesting phenomenon has not hitherto been given.

Properties of Fluids and of Solid Metals.—Prof. Chandler Roberts Austen, F.R.S., recently delivered at the Royal Institution a lecture of exceptional interest on "Certain Properties Common to Fluids and Solid Metals." He said that, although the characteristics of solid metals and of fluids appear at first to be very different, there is much evidence of an experimental nature to show that under certain conditions solid metals behave like fluids. The phenomena attending the passage of metals from the fluid to the solid state were first dealt with, and the beautiful experiment of Van Riemsdijk, showing that pure gold on freezing behaved like water—that is, it may be cooled below its solidifying point without becoming solid. When, however, by agitation, the metal sets, it becomes brilliantly luminous, owing to the liberation of the latent heat of fusion. Passing to solid metals, Professor Roberts-Austen referred to a forgotten experiment made by Louis Lemery in 1726, showing that lead when cast in a peculiar form is sharply sonorous, and he alluded to Réaumur's experiments on this subject, which proved that hammering or the transfer of matter from one position to another by flow alters the shape of the grains and the way in which they touch one another, and leaves them, in the hammered lead, no longer free to vibrate. The results obtained by the late M. Tresca on the flow of solid metals were then fully dealt with, and the lecturer passed to the elaborate investigations of Prof. W. Spring, of Liége, on the compression of finely divided metals into solid blocks. He repeated many of M. Spring's experiments, obtaining crystalline bismuth under a pressure of 6000 atmospheres, and building up the alloy fusible metal, which fused at 100 degrees Cent. from the powders of its constituent metals, which have much higher melting-points. Some observations by Mr. Baker, the engineer of the Forth Bridge, were alluded to as showing the important and beneficial effect of compression on the mechanical properties of steel destined to be used for certain purposes. Professor Roberts-Austen concluded by showing that, as regards absorption of gas, diffusion, vaporization, and surface tension, solid metals present close analogies to fluids.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

GRANTED MAY 25TH, 1886.

342,365. Miner's Combination Box. James H. Kirby, Coal Valley, West Va.
342,366. Method of Blasting Rock. John L. L. Knox, Alleghany, Pa., Assignor to the Knox Rock Blasting Company.
342,387. Machine for Corrugating Sheet Metal. L. Lewis Sagendorph, Cincinnati, Ohio, Assignor of one half to Harlan P. Lloyd, same place.
342,391. Piston-Rod Packing. George W. Scheuing, Chicago, Ill.
342,421. Apparatus for the Treatment of and Extraction of Precious Metals from Ores. David W. Birmingham, Clifton, New York.
342,422. Process of Separating Metals from their Ores. Mark Birmingham, Clifton, New York.
342,435. Ore-Concentrator. William A. Frank, Pinal, Arizona, Assignor of one half to Thomas Wicks, same place.
342,466. Blast-Furnace. William H. Rosewarne, Cincinnati, Ohio.
342,487. Furnace for Burning Natural Gas. William J. Ward, Pittsburg, Pa.
342,500. Apparatus for Distilling Hydrocarbon Oils. Richard Dean, Cleveland, Ohio.
342,506. Pulverizing-Mill. Robert Forbes, Downieville, Cal.
342,511. Fire-Door for Furnaces. John B. F. Herreshoff, Brooklyn, New York, Assignor to himself, George H. Nichols, and William H. Nichols, all of same place.
342,548. Process of Depositing Solid Particles Suspended in Air or Gas. Alfred O. Walker, the Lead-Works, Chester, England.
342,564. Process of Refining Crude Petroleum Oil. G. L. Benton, Titusville, Pa.
342,565. Apparatus for Refining Crude Petroleum. G. L. Benton, Titusville, Pa.
342,578. Manufacture of Bichromate of Soda. William J. Chrystal, Glasgow, County of Lanark, Scotland.
342,590. Furnace for Steam Engines and other Purposes. Edward Fales, Chicago, Ill.
342,593. Pulverizer. Laurel Findley, Homer, Mich.
342,599. Process of Making Neutral Aluminous Compounds. Frank P. Harned, Camden, New Jersey.
342,605. Rock-Drilling Machine. John Jennings, Cañon City, Colo., Assignor to Kittie C. Jennings, same place.
342,607. Process of Deoxidizing and Reducing Iron Ores by Means of Natural Gas. Edward D. Kendall, Brooklyn, New York.
342,614. Mining-Machine. Benjamin A. Legg, Columbus, Ohio, Assignor to Joseph Andrew Jeffrey, same place.
342,629. Limekiln. Clark D. Page, Rochester, New York.
342,635. Mining Machine. Henry J. Richards, Wilkes Barre, Pa.
342,646. Manufacture of Bichromate of Potash. William Simon, Baltimore, Md., Assignor to the Baltimore Chrome-Works, same place.
342,647. Process of Manufacturing Ammonium Bichromate. William Simon, Baltimore, Md., Assignor to the Baltimore Chrome-Works, same place.
342,659. Pipe-Joint for Gas Mains. George Westinghouse, Jr., Pittsburg, Pa.
342,678. Means for Drying Phosphate Rock, etc. Frederick Brotherhood, Charleston, S. C.
342,722. Process of and Apparatus for Distilling Ammonia. William C. Wren, Brooklyn, Assignor to the Consolidated Refrigerating Company, New York City.
342,741. Ore-Separator. Frank Fox, Ashland, Wis.
342,749. Heating and Puddling Furnace. John O. Hughes and James Eynon, Philadelphia, Pa.

REISSUE.

10,729. Machine for Splitting Bars and Sheets of Iron or Steel. Cyrus M. Carnahan, Pittsburg, Assignor of one half to William J. Hammond, Bellevue, Pa.

FURNACE, MILL, AND FACTORY.

The New Jersey Wire Cloth Company, of Trenton, New Jersey, has just furnished, through its Chicago agents, John A. Roebling's Sons' Company, 215 Lake street, its patent stiffened fire-proof wire lathing, for use throughout the new Studebaker Building now erecting in Chicago.

A company has been organized at New Castle, Pa., for the manufacture of steel wire nails, and work has been already begun on a mill. The officers are: President, John Stevenson; Secretary, Rufus C. Patterson; Treasurer, J. P. H. Cunningham.

Two of the Reading Iron-Works' large furnaces, at Reading, Pa., which blew out over a year ago, and have since been undergoing improvements, giving them increased capacity, are preparing to resume. Furnace No. 2, capacity 500 tons a week, will start in next week, and Furnace No. 1 will be ready to start in a month or two. Its capacity will be over 300 tons a week.

It is now positively settled that the Russia rolling-mill at Niles, Ohio, will start up soon.

One of the Kemble Iron Company's furnaces at Riddlesburg, Pa., has been put in blast successfully after being banked since November, 1884.

The Dakota Iron and Steel Company, with head office at Minneapolis, Minn., and works at Fargo, Dakota, has been organized, with a capital of $750,000. The contract for the works has been placed in the hands of Messrs. Rose & Cull, engineers, of Chicago, and operations have already been begun. Steel car-wheels will be made. Mills will be added for producing merchant sections, and a complete steel casting plant for all ordinary purposes will supply the Western market with all requisites for machinists' uses.

A company has been organized, with offices at Denver, Colorado, and New York City, for the manufacture and sale of Lancaster's hydraulic wedge, hydraulic coal wedge, caloric engine, and gas engine, of which it controls the patents.

PROPOSALS.

A. Mordecai, Lieutenant-Colonel of Ordnance Commanding, New York Arsenal, Governor's Island, will receive proposals until June 25th for furnishing the following supplies during the fiscal year ending June 30th, 1887: Hydraulic jacks, rope, etc.; ironmongery, coal, oils, chemicals, paints, paint-brushes, tools, utensils, etc., etc.

At the office of the Comptroller, city of Alleghany, Pa., proposals will be received until June 7th for furnishing and setting up in complete order, before July 1st, one battery of two boilers, at Howard Street pumping station, Tenth Ward. Said boilers to be forty inches in diameter and twenty-six feet long, with two flues in each boiler fifteen inches in diameter.

J. J. Burns, General Storekeeper, Union Pacific Railroad Company, at Omaha, Neb., will receive proposals until June 10th for 6000 tons of steel rails, to be delivered at Omaha in August and September.

At the City Clerk's office, Lawrence, Kansas, proposals will be received until June 10th for constructing water-works; the capacity of the machinery to be two and a half million gallons in every twenty-four hours in the aggregate; engines and boilers to be in duplicate. Also, the laying of twelve miles of cast-iron pipe.

LABOR AND WAGES.

The Black Diamond Steel Company, at Pittsburg, Pa., has voluntarily advanced the wages of all its employés ten per cent.

All the soft coal miners in the Broad Top region of Pennsylvania struck again on the 1st inst., excepting those in the Robert Hare Powell mines. The cause of the strike was the reduction from 50 to 40 cents a ton, the price agreed upon at the conference in Clearfield last week. The men also object to their pay for what is known as dead-work, which includes the logging of the mines, making shafts, etc.

The annual convention of the Amalgamated Association of Iron and Steel Workers opened in Pittsburg, Pa., on the 1st inst. The principal work of the convention was the completion of a new scale of wages to stand for one year, beginning July 1st, and to submit to the convention a proposition for the establishment of a co-operative rolling-mill to be owned by the association. The object is to ascertain the cost of manufacturing iron and steel.

The annual convention of the United Nailers and Heaters of America was held in Pittsburg, on the 31st ult. The question of applying for readmittance into the Amalgamated Association of Iron and Steel Workers, which the convention was called to consider, was discussed at length and finally carried by a unanimous vote. A petition was presented to this Association and was decided affirmatively.

TRANSPORTATION NOTES.

A company, composed largely of members of the Philadelphia Natural Gas Company, is arranging to build a line of railroad from Stewart station, on the Pennsylvania road, to the Murrysville gas-field. The line will be about eight miles in length. The road will be used mainly for the transportation of supplies to the gas-field.

A charter has been issued to the Nescopec Railroad Company to run from a point on the North & West Branch Railroad near the mouth of Nescopec Creek to a connection with the Sunbury, Hazleton & Wilkes-Barre road near Rock Glen, Luzerne County, a distance of twelve miles. The capital is $1,350,000.

COAL TRADE NOTES.

COLORADO.

The Grand River Coke and Coal Company has been organized in New York City, under the laws of Colorado, with a capital stock of $1,000,000. Among the directors are Frank F. Thompson, of New York, and W. B. Devereux. The company will build extensive coke-ovens in Pitkin or Garfield county, and carry on an extensive coal-mining business.

ILLINOIS.

The South End Co-operative Coal Company has been organized at Springfield, with a capital stock of $7000; incorporators, L. E. Markey, Eugene Colgan, and John Ambrose.

OREGON.

The Black Diamond Coal Company has brought suit in the Superior Court at San Francisco, against the Newport Coal Company, a corporation organized under the laws of California, but whose mine is located in Oregon, for $5000 rent, at the rate of $1000 a month, of a wharf belonging to the plaintiff, at the Southport mine, Coos County, Oregon, leased to the defendant.

PENNSYLVANIA.

COKE.

The Coke Producers' Association will hold its next monthly meeting at Ohio Pyle Falls, June 19th.

VIRGINIA.

The Southwestern Improvement Company has given $3000 to a fund for draining the town of Pocahontas, and will also spend $3000 additional in a park and other improvements.

WEST VIRGINIA.

The Raymond City Coal Company has settled all difficulties with its employés at its Raymond City mine, on the Kanawha River, below Charleston, and will resume operations.

GAS AND OIL NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to May 29th:

	1886. Gallons.	1885. Gallons.
From Boston	1,890,029	2,645,681
Philadelphia	51,868,784	47,954,968
Baltimore	4,560,148	3,753,478
Perth Amboy	1,593,770	.....
New York	150,347,860	139,242,471
Total exports	210,260,591	193,596,598

COLORADO.

While sinking an artesian well on the premises of ex-Governor Evans, in the heart of Denver, on the 29th ult., oil was struck at a depth of 1100 feet. The well will be sunk several hundred feet deeper.

PENNSYLVANIA.

A charter has been granted to the Keystone Natural Gas Company, of Parker City. Capital, $10,000.

In the equity case of the American Tube and Iron Company against the Hite Natural Gas Company, to enjoin the sale of any of the partnership property, and to decree the partnership to have been dissolved by the sheriff's sale, the court granted the injunction and appointed a receiver.

The injunction case against the Standard Gas Company, of Meadville, restraining it from laying pipes in that city, has been dissolved, and the company is now at work.

GENERAL MINING NEWS.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

BULWER CONSOLIDATED.—It is expected that the mine will be opened enough to start the mill by the fifteenth of this month. On the 400-foot level, the vein carries a streak of high-grade ore, from 10 to 12 inches wide, on the west wall. The fissure is 4 feet wide, with perfect walls and very regular, but a porphyry horse cuts out much of the ore.

SIERRA COUNTY.

PIONEER GOLD MINING COMPANY.—In the United States Circuit Court at San Francisco, on the 28th ult., Judge Sawyer gave a judgment in favor of the defendant in the well-known suit of the Pioneer Gold Mining Company *vs.* Benjamin F. Baker, involving the title of the above-named company's mine in Sierra County and the recovery of $72,000.

CANADA.

PROVINCE OF ONTARIO.

BEAVER.—A great deal of preparatory work is doing at this mine. The air-compressors and steam-drills are ready to start work, and machinery is on the ground to be erected.

MICHIPICOTEN NATIVE COPPER COMPANY.—Mr. J. Cozens is working the property of the old Michipicoten Native Copper Company, and has been sinking all winter on the old shaft, which is now down 450 feet. The next move will be driving a cross-cut. A recent new discovery of native copper, in a conglomerate of hard jasper, and carrying native silver, has excited new interest in the property. The vein is two feet wide.

RABBIT MOUNTAIN.—The mill is rapidly nearing completion and will soon be ready for its machinery, which is on the ground.

COLORADO.

CLEAR CREEK COUNTY.

LITTLE ALICE.—At this property, which is situated on Fall River, active operations will soon begin in the way of sluicing on the placer claims of the company. The company will probably put up a stamp mill this season, when the property will be more thoroughly explored.

GILPIN COUNTY.

COURTLAND MINING AND MILLING COMPANY.—It is stated that the company has put $10,000 in bank with which to prosecute work on the mines owned by it on Quartz Hill. Work in the main shaft has begun.

GREGORY-BOBTAIL.—The diamond drill-hole sunk from the end of the incline shaft on the Gregory-Bobtail lode, Black Hawk, which is about 100 feet in length, of a diameter of two inches, was charged with nitro-glycerine, to cut the large amount of water now stored in all the workings of this property. The result has been a success.

LAKE COUNTY.

The Leadville *Herald-Democrat* reports the following:

ANTIOCH.—The twenty-five stamp mill at Oro City has been secured, and will be used hereafter in the treatment of the Antioch ore. Although little ore has been shipped from the Antioch mine for some months, work was not suspended, and there is a large amount of broken ore of good grade on hand. To facilitate the extraction of ore, a tunnel will be driven to strike the first level in the mine. As the vein is very wide, this opening is calculated to supply the mill for many months and to greatly reduce the cost of mining the rock. The Antioch mill, which was formerly run on quartz from this mine, will be started on custom work.

DUNKIN.—The lessees of the north shaft of this mine, who began drifting some time ago, have encountered a fair streak of iron ore, and will probably soon recover the great expense to which they have been put in opening the lower stratum in the property.

IDEAL.—The Katy lode, the property of this company, made its first shipment on the 25th ult.

MINNIE VS. COLONEL SELLERS.—In the suit of the Minnie against the Colonel Sellers mine, for ore extracted by the latter from the territory of the former, and for which the Minnie claimed damages of

$60,000,the jury returned a verdict awarding the Minnie owners $20,779 damages.

WOLFE TONE.—This mine, which has shipped between 7000 and 8000 tons of ore since the first of January of the present year, is producing very little just now. The decline of the yield of the mine is due to the absence of a favorable contract with the smelters. In the mean time, the development of the property will be continued.

PARK COUNTY.

KINGSVILLE.—This company has been incorporated with a capital stock of $60,000. Operations will be in Park County. The business office will be at Hall's Gulch.

SAN JUAN COUNTY.

HARLEM GOLD AND SILVER MINING COMPANY.—This company has been incorporated by Julius Heugstler, Otto Baese, Charles Kramer, and Julius Steglicle, of New York City, and Theodore Stahl, of Cleveland. The capital stock is $2,000,000. The offices of the company are at Silverton and New York, and the place of operation San Juan County.

SUMMIT COUNTY.

QUEEN OF THE WEST.—The report published in this column last week that this mine had been sold to a New York syndicate for $250,000, we are informed by one of the promoters is not correct. We are told the mine was offered in St. Louis some months ago for $160,000 and a share of the stock, and that the offer was withdrawn. The price at which it is now offered in New York is not stated; but it is intimated it is above $250,000, owing, it is said, to an improvement in the appearance of the mine. The mine has been reported on by Mr. Charles J. Moore, E. M., of Leadville, and by Mr. W. F. Patrick, manager of the Colonel Sellers mine, in Leadville. These gentlemen speak well of the property, and claim that the mine has great reserves capable of yielding a large profit.

ROBINSON CONSOLIDATED.—During the past six months, a great deal of development-work has been done, and a great deal of ore opened up. The incline following the main ore-channel has reached the 1600-foot level, and still shows fine ore in the face. While working the lower levels, the mine produced about twenty tons of ore a day. Recently, however, the surface water has increased greatly, and risen to the eighth level; nearly all work is at a stand-still. As soon as the surface water disappears, operations will be resumed. It is said that the water can not rise any higher in the mine than the eighth level, which is connected with the Champion tunnel, forming an outlet.

DAKOTA.

CUSTER COUNTY.

DANSBY.—The claims worked by this company are the Boss and Eureka, located in the Dansby District. The development is a shaft thirteen feet wide sunk to a depth of forty feet on the Boss. A shaft twenty-five feet in depth has been sunk on the Eureka, disclosing an ore-body six feet in width and widening as depth is attained. The capitalization is $2,000,000; shares, par value $10.

LAWRENCE COUNTY.

The boom organized in Deadwood some time ago continues, and there is as yet no stoppage to the numerous organizations of mining companies. Below we give a few of the most important created during the week ended the 26th ult.:

ALABAMA.—This company, which has just been organized, will work the Alabama, Atlantic, and Arctic, in the Crow Peak District.

CALEDONIA.—Official advices, dated May 24th, show the following: Ore produced from the 425-foot level, 838 tons; cave, 585 tons; total, 1423 tons. The drift from the bottom of the winze advanced 4 feet, making a total of 16 feet. The south drift advanced 6 feet; total, 137 feet.

MONITOR GOLD AND SILVER MINING COMPANY.—The capital stock has been fixed at $2,500,000; shares, par value $10 each. The property consists of three claims on Nevada Gulch, the Keystone, Keystone Extension South, and Harold lodes. The principal place of business will be at Lead City.

NEW ERA.—The property consists of the Lone Pine, Lone Jack, Era, Meadow Lark, and Shaft Fraction. The developments consist of two tunnels, run in a distance of fifty feet each on the Lone Pine. The ore-bodies are large; in one of the tunnels, a 10-foot face is all in high-grade ore. On the other lodes, numerous shafts have been sunk to a depth of from 25 to 50 feet.

ORO FINO.—Twenty stamps are operated. The ore that supplies the mill comes from the 200-foot level, and assays from $14 to $22 a ton.

UNCLE SAM.—The first clean-up under the new management had a value of about $6000, the result of a run of twenty stamps for fourteen days, and at the last thirty stamps were in operation for a few days. The ore-body on the 250-foot level continues to show up well, and is developed as rapidly as possible.

WILKINSON CONSOLIDATED.—The capitalization is $2,500,000; shares, par value $10 each. The property consists of the Wilkinson lode, Keystone, and two fractions. The principal work has been done on the Wilkinson, on which a shaft has been sunk to a depth of 150 feet, disclosing a good ore-body.

INDIA.

The following brief description, from an official report, of the results obtained so far on the experimental petroleum-boring at Khatoon, under the Beloochistan Agency, is of general interest, and may have important influence on railroad working. Boring was begun in February last, and after some considerable boring and working difficulties had been overcome, two veins of oil were struck at 28 feet and 36 feet depth respectively. On March 6th, drilling was stopped and the oil tested. A pump was improvised, and during the hour or so that pumping was continued, the thick oil came out in a stream of over 6 inches in diameter. Next day, pumping was continued for seven and a half hours, with the result that about 2000 gallons of oil were collected, and there was no appearance of the oil giving out. Pumping then ceased, as it was useless to raise more oil until storage was obtained. The boring is now cased off, and the drilling will be carried to a greater depth with the view of obtaining a lighter-gravity oil, and arrangements are making for further borings. The oil obtained is used in the boiler furnace with very satisfactory results, and it is proposed to adapt some of the engines of the Sind-Pishin line for experiments with the oil as fuel.

MEXICO.

The old mine of Palo Blanco, eight leagues from Culiacan, Sinaloa, has been denounced, and it is expected that it will soon be reopened. It was discovered in 1757, and was at one time very rich in gold.

MICHIGAN.

COPPER MINES.

KEARSARGE.—Work at this mine is prosecuted vigorously on the necessary surface improvements.

WOLVERINE.—Work, it is stated by the tributers, will soon be discontinued, unless a decided change for the better takes place very soon in the underground appearance of the mine. The rich streak of ground that was recently encountered on the fourth level near No. 2 shaft has almost entirely "played out," leaving but little ground exposed.

IRON MINES.

The following statement, given by the Marquette *Mining Journal*, shows the amount of iron ore shipped from the ports of this district for the season of 1886, up to and including Wednesday, May 26th:

	Tons.
Marquette—Marquette District	98,214
St. Ignace	10,787
Escanaba—Marquette District	67,546
Menominee District	110,985
Grand total of lake shipments	287,532
Shipments of Pig-Iron.	
Pioneer furnace	430
Deer Lake furnace	175
Vulcan	2,932
	3,537

MITCHELL.—Explorations started from the old workings of this mine (formerly Shenango) some two or three months ago, have resulted in the discovery of a new and distinct vein of ore fifty feet wide. This new deposit is very low in phosphorus, high in iron, and of better quality in other respects, than the product of the old workings.

MONTANA.

JEFFERSON COUNTY.

The group of mines, the Silver King, Bonanza, Argenta, Cleopatra, Hannibal, Sierra Madre, and Crown Point, has been bonded to a California company, and active operations will begin at once.

LEWIS & CLARKE COUNTY.

MOUNT HELENA TUNNEL AND MINING COMPANY.—The work of sinking 100 additional feet has been completed, and the shaft is down 142 feet. At 79 feet, a fine vein of ore that will net over $50 a ton was encountered; and about thirty feet farther, another body of ore of the same value was struck. The company will cease sinking and begin taking out ore by running levels along the leads.

PEERLESS JENNIE.—This company has been organized at Helena, with a capital of $1,000,000, for the purpose of purchasing and operating the Vaughn mines on Red Mountain. President, C. B. Vaughn; Vice-President, S. T. Hauser; Treasurer, W. C. Child; Secretary, H. R. Comly. Mr. Vaughn has owned and worked these mines for the last fourteen years. They lie in a group on Red Mountain, about four miles south of Rimini. The principal leads are the Peerless Jennie, Little Jennie, and Queensbury. The main lead shows a body of ore from 150 to 250 feet wide, covered by a tunnel right of 2000 feet and six or seven thousand feet of patented claims. There are 5000 or 6000 tons of second-grade ore and 200 tons of the first quality on the dump awaiting shipment. The new company will at once begin taking out ore, which it will either reduce in works to be erected or ship to Eastern or territorial smelters.

MADISON COUNTY.

NEW YORK & MONTANA.—Ten additional stamps have been added to the company's mill.

PROSPECT.—Negotiations are pending for a sale of this mine to New York capitalists.

SILVER BOW COUNTY.

CORA.—It is stated that operations have been resumed at this mine, which has not been actively and continuously worked for several years. The lower level exposes a well-defined and regular vein of silver-copper ore from five to twelve feet wide, much of it good smelting ore, and some of it requiring concentration.

GRAY ROCK.—Operations will soon begin at this mine. The main shaft will be sunk to the 400-foot station, and explorations from that point continued.

NEVADA.

ELKO COUNTY.

GRAND PRIZE.—This mine closed down on the 20th ult., the reason being unknown. There is still a large quantity of unprospected ground on the property.

LANDER COUNTY.

MANHATTAN.—The mill at Austin will soon start up for another run. The dumps of the tributers, as well as those of the company, have become pretty well filled; and in the various stopes and breasts of the mines, good working openings are made, insuring a good run of the mill for some months.

STOREY COUNTY—COMSTOCK LODE.

From the Virginia City *Chronicle*, we take the following:

CONSOLIDATED CALIFORNIA & VIRGINIA.—During

BULLION PRODUCTION FOR 1886—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of April.	Year from Jan. 1st, 1886.
		$	$
Alice, G. S	Mont.	.....	166,714
Boston & Montana, G.	Mont.	56,467	271,886
Caledonia, G.	Dak.	19,441	81,412
Christy, S.	Utah.	21 580	85,460
Chrysolite, S.	Colo.	**13,616	72,883
Colorado Central, S.	Colo.	20,068	88,777
Daly, S.	Utah.	.....	126,728
Deadwood-Terra, G.	Dak.	48,116	156,936
Derbec Blue Grav., G. S.	Cal.	15,449	62,796
Elkhorn, G. S.	Mont.	16,723	81,918
Eureka, S. L.	Nev.	.....	27,275
Father de Smet, G.	Dak.	———	61,376
Freeland, G. S. C	Colo.	26,525	98,731
German Consolidated, G.	Colo.	.....	53,673
Granite Mountain, S.	Mont.	123,300	484,600
Head Center Cons., S.	Ariz.	———	4,633
Hecla, G. S. L. C	Mont.	.....	251,303
Holmes, S.	Nev.	43,936	232,078
Homestake, G.	Dak.	94,478	394,939
Hope, S.	Mont.	15.500	42,900
Iron Hill, S.	Dak.	**38,726	162,634
Iron Silver, S. G.	Colo.	56,134	252,540
Kentuck, S.	Nev.	582	1,040
Lexington, G. S	Mont.	98,522	317,159
Montana Limited, G. S.	Mont.	.....	356,705
Moulton, G. S.	Mont.	76,737	215,500
New Pittsburg, S	Colo.	———	5,230
Ontario, S.	Utah.	.....	495,542
Plymouth Consolidated, G.	Cal.	50,779	205,971
Plutus, G. L. C	Colo.	15,285	83,159
Ropes, G. S.	Mich.	2,694	10,691
Standard Consolidated, G.	Cal.	12,817	66,068
Tombstone, G. S. L.	Ariz.	77,405	271,741
Total		.....	$5,149,542

G., gold; S., silver; L., lead; C., copper; M., mica. Silver valued by the different companies from $1@$1.29 per ounce; gold, $20.67. *Not including value of lead and copper. **Silver valued at $1.29. †Royalty. ‡Net. §Ore sales. ‖Not official. —— No shipments during month mentioned.

the week ended the 22d ult., 1123 tons of ore were shipped to the Morgan mill, and 1715 tons to the Eureka mill. The average value of the ore milled, according to assays from battery samples, was $13.99 a ton for that crushed at the Morgan mill, and $14.64 for that crushed at the Eureka mill. Bullion of the assay value of $40,676.86 was shipped to San Francisco.

HALE & NORCROSS.—West cross-cut No. 5, on the 2900 level, has entered the vein. The ore is not in a solid body. The ground is perfectly dry, with no signs of moisture ahead. The south drift from the station on the 3200 level of the deep winze east of the vein is said to be penetrating mineral matter.

OSBISTON SHAFT.—On the 22d ult., only a depth of 50 feet of water remained to be pumped out, in order to drain the shaft to the bottom.

UNION CONSOLIDATED.—The 500 level has been stripped and abandoned, and the shifts transferred to the face of the joint Mexican lateral drift on the 700 level, and are advancing it toward the Union south line.

UTAH.

SUMMIT COUNTY.

CRESCENT.—The first large shipment of the season has been made to Salt Lake City, and shipments will be continued regularly hereafter.

MORGAN.—As soon as the litigations are settled, large hoisting-works and machinery will be erected.

ONTARIO.—It is rumored that this company intends to erect a new sixty-stamp mill.

WISCONSIN.

BIRMINGHAM IRON COMPANY.—This company has been organized at Ashland, with a capital stock of $1,000,000, to do a general iron mining business. The incorporators are George H. Hopper, H. F. Higby, John Donahue, S. W. Tanner, and F. W. French.

MARKETS.

NEW YORK, Friday Evening, June 4.

Silver.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
May 29	45⅝	99⅝	June 2	45⅛	98¾
31.	45⅝	...	June 3	44¾	98
June 1.	45⅛	98¾	June 4	44¾	98

The rally in silver in London at the beginning of the week has since been lost, and the market has receded to the lowest figure of the fall of the previous week; and all that can be said is, that the market is steady for the moment at the figure given for this day, while the India exchanges continue week and unsettled.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3 per cent. During the week, the bank gained £94,000 bullion; but the proportion of its reserve to its liabilities was reduced from 37 7/16 to 36 11/16 per cent, against 50½ per cent at the same date last year. On the 3d inst., the bank gained £6600 on balance. The Imperial Bank of Germany reports a specie gain for the week of 2,680,000 marks.

Copper.—This market is quiet, and though some of the other Lake companies have followed Calumet & Hecla down to 10 cents, this price has been refused by others. Baltimore, Orford, and P. S. C. are quoting from 9½@10c., and Electrolytic 10@10½c. We refer editorially to the statistical position of copper, and a well-informed correspondent enlarges upon the outlook of the market.

The question is frequently asked whether the Calumet & Hecla is likely to repeat its sale in August, when the present contracts have expired, and the following figures are given to show that to be improbable.

The stock of copper held by the Calumet & Hecla May 1st has been estimated at about 14,000,000 pounds; its production is about 4,000,000 pounds a month, and its recent foreign sales are estimated to have been 8 or 9 million pounds, and the recent 10-cent sales are now estimated—for the company confirms none of these figures—at about 12 million pounds. On the basis of these estimates, the company would have available on August 1st about 6 million pounds, not including the July output; and assuming it to sell nothing more between this date and August 1st, of course a contract then made would run over several months, so that it would be quite possible to "repeat the dose," if the company were so inclined. Some persons in a position to know the facts state that the available supply August 1st would be much more than 6 million pounds, which might mean that the recent sales were less than 12 millions, or that the foreign deliveries extend over the entire year.

It appears certain that no immediate improvement in prices is anticipated unless the foreign market goes up, of which there is no sign at present.

So far as the 10-cent price has affected Calumet & Hecla, it is undoubtedly a better price than it received for the large amount of copper it sold in Europe last year, and consequently its dividends will not be decreased. It is not, however, saying much when it is said that it did better this year than last in its sales.

EXPORTS OF COPPER FROM JANUARY TO APRIL, 1886; ALL PORTS OF UNITED STATES.

MONTHS.	Ores. Tons	Ores. Value.	Ingot, bars, etc. Lbs.	Ingot, bars, etc. Value.
April, 1886.....	2,892	$329,752	1,102,109	$112,788
Since Jan. 1, 1886.	6,531	922,475	5,500,726	560,823
Same months '85.	11,509	1,097,142	13,274,773	1,496,313

MONTHS.	Sheets. Lbs.	Sheets. Value.	All other m'f'res. Value.	Total value.
April, 1886.....	3,109	$468	$6,432	$449,440
Since Jan. 1, 1886	11,224	1,879	27,777	1,512,954
Same months, '85.	17,132	2,671	2,094,310	4,690,436

Tin.—This metal continues to boom, whether because speculators in London have become disgusted with copper and have dropped, it does not appear; but the price in London is quoted to-day £98 15s. for spot and £99 10s. for three months, and here 21·90@22·05c., with quite an active market. Sales recorded at the Metal Exchange during the week amounted to about 130 tons, at 21·85@22·05c.

Lead.—This market has been extremely quiet, with sales reported 60 tons Omaha at 4·65c., and a little Chemical Lead at 4·70c.

Since the Richmond sale reported in our last, that company has stored its lead and is nominally quoting 4·75c., though 150 tons just arrived were sold, it is said, at the same time as the 250 tons reported a week ago, and at 4·65c. Foreign lead is advancing in London, where it is quoted to-day £12 15s. for Spanish, and £13 5s. for English. Foreign lead can be laid down here at about 4·80@4·85c., the freight from Spain to New York not much exceeding that to London.

The Western markets still keep above the equivalent of the prices ruling here. We hear of sales of Omaha lead in Pittsburg at 4·65c, and Chemical Lead is offered at East St. Louis at 4·50c.

We quote manufactures: Sheet-Lead, 7¾c. net, and Lead Pipe, 6¾c., less the usual 20 per cent discount. Shot, Buck and Chilled, $1.45 per bag, in 25-pound bags.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

Market continues very dull, and, since the date of our last report, prices have further declined. Buyers, expecting a decline, are holding off, and buy only for immediate wants. Sales will scarcely foot up 300 of both Common and Refined, at prices ranging from 4·45@4·50c. for Common and 4·50@4·55c. for Refined.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

Market very dull and no buyers; consequently, it is hard to give figures. Values entirely nominal at 4·55c.; sellers, at 4·55c.

Spelter.—The market remains unchanged. We quote 4·45@4·75c. for Western, and 6¼@6½c. for New Jersey. Foreign Spelter is quoted 4·80@4·90c.

New Jersey Zinc Oxide is quoted 3¾@4¼c.

Silesian Spelter in London was quoted to-day £13 17s. 6d.

Sheet-Zinc is worth 4½@5·60c.

Antimony.—This market is quiet at 8½@8⅝c. for Hallett's; 9c. for Cookson's here; and in London £33 for Hallett's.

Nickel.—We quote 70c. nominal.

Bismuth—Is quoted at $2@$2.25 a pound, the latter price for small quantities.

Aluminium—Is quoted at $1@$1.25 an ounce.

Quotations of Sundry Minerals and Minera Products.

Acid—Sulphuric, p. lb., 60°, 1c.; 66°, 1·1@1¼c.; Muriatic, 18°, 1¼@1½c; 20°, 1½@1¾c.; Nitric, 36°, 5½c.; 42°, 7c.
Alkali—p. lb, 36 p. c., 1·25c.; Refined, 58°, 1·40c.
Alum—p. lb., lump, 1¾c.; ground, 1¾c; p. ton, L'pool, lump, £5 10s.; Sulph. of Alumina, £4 12s. 6d.
Ammonia—p lb., Sulph., 3@3¼c.; Carb., 9c.
Arsenic—p. lb., white, 2c.; red, 6¼c.; p. ton, Plymouth, £8 10s.
Asbestos—American, p. ton, $20; c. i. f. L'pool best Italian, p. ton, £20.
Asphaltum—Trinidad.
Barytes Sulph.—Am. prime white, p. ton, $18; foreign, $20; Off color, $13; Carb., lump, $30; No. 1, casks, Duncorn, £3 7s.; No. 2, bags, £2.
Bleach—over 35 p. c., p. lb., 1½@1·65c.
Borax—p. lb., 6@7½c.; Refined, p. ton, L'pool, £29.
Bricks—p. m., pale, $5; Jerseys, $7.50; Haverstraw, $8.50; front bricks, $10@$25.
Bromine, p. lb., 37c.
Building Stone, Amherst Freestone—p. c. ft., 75c.@$1; brownstone, $1@$1.25; granite, rough, 45c.@$1.
Cement—p bbl., Rosendale, $1; Portland Am., $2@$2.25; foreign, $2.25@$2.50.
Cobalt Oxide—p. lb., $2.35.
Chalk—p. lb., 4c.; precipitated, 5@7c.
China Clay—p. ton, English, $13.50@$17; Southern, $11.50.
Chrome Yellow—p. lb., 6@18c.
Cobalt Oxide—p. lb., 2·25c.
Copper, Sulphate, English Wks., p. ton, £14 15s.; Precipitate, p. unit, 8s. 6d.
Copperas—p. lb., common, 60c.; best, 1¼c.; p. ton, in casks, Liverpool, £42 6s.
Emery—p. lb., grain, 3½c.; flour, 2½c.
Feldspar, p. ton, ground, $15.
Indium, metallic—p. lb., $27.
Kainit—ton, $6.50@$7.50.
Lead—p. lb., Red, 6@6¼c.; White Am. in oil, 6½@7c.; English, 8½c.
Litharge—p. lb., flake, 6c.; p. ton, c. i. f. Hull, £14 5s.
Magnesite—Syrian, p. ton, $15.
Magnesium, p. oz., $1.
Manganese—p. ton, lump, 70 p. c., c. i. f. L'pool, £3 2s. 6d. 1s. 6d. per unit, up or down.; ground, £6; metallic, p. lb., $1.10.
Mineral Wool—p. lb., 1@3c.
Molybdenum (metallic)—p. lb., $6.
Paints—Venetian reds are all 336 lbs. net in each barrel. *Venetian Red*, English, H. R. & Co.'s (M), $1.40, H. R. & Co.'s (H), $1.20: H. R. & Co.'s (F. V. A.), $1.12½; American Venetian Red, p. lb., 1¼@1¾c.; *Spanish Brown*, English, 1@1¼c.; American, ⅞@1c.; English Indian Red Super, 6@7c.; English Persian Red, 16c.; English Turkey Red, 6c.; English Tuscan Red, 8c.; English Rose Pink, 9c.; English Chrome Yellow, 8@18c.; English Drop Blacks, 8@12½c.; *Ochers*, French, 1½@5c.; American, 1@2c.; *Umbers*, Turkey Burnt, 3@4c.; Turkey Raw, 2½@3c.; Am., 1½c.; *Sienna*, Italian Burnt, 6@7c.; Italian Raw, 5@6c.; Am., 2@3c.; Ferronite, ground magnetic iron, 3½c lb; in oil, 5·20c. net.
Phospuate Rock—p ton, S. Carolina, $8; ground, $10.50. Canadian apatite, lump, 24c. p. unit for 80 p. c. and over.
Phosphorus, lb., 70c.
Plumbago—Ceylon, 4@5c.; Am., 6@9c.; London, per cwt., £10@£15.
Potash—Bromide, 34@42c.; Chlorate, 15½@17c.; Carb. 4½@5½c.; Caustic, 7½@8c.; Iodide, $2.65.; Muriate 1¾c.
Potassium, metallic—p. oz., $2; Cyanide, p. lb., 30c.
Pumice-stone—Selected, 2¼@2¾c.; Original, cks., 1⅝@1½c.; Lumps, 3@5c.; powdered, 2@3c.
Pyrites—Non-cupreous, per unit, sulph., 10@12c.
Quartz, ground, p. ton, $18.
Quicksilver—44c. p. lb.; London, £6 5s. p. flask (75 lbs.).
Rotten-stone—p. lb, powdered, 3@3½c.; lump, 5@6c.; English, p. ton, powder, £3; lump, £4.
Salt—Liverpool ground, p. bbl., 70c.; Turk's Island, 25c.
Salt Cake—p. lb., 65@¾c.
Saltpeter—p lb., crude, 4¾c.; Refined, 6@8c.
Slate—Purple and green roofing, p. 100 sq. ft., $6; red, $5; black, $5.
Soda Ash—p. lb., Carb., 48 p. c., 1·35@1·40c.; Caustic, 48 p. c., 1·35c; 70 p. c., 2·50c.; Sal, English, 75c.; American, 90c.; nitrate, 2¼@2½c.
Sodium, metallic—p. lb., $4.50.
Sulphur—Roll, lb., 2½c.; Flour, 2½c.; Virgin Rock, 2½c; Brimstone, crude, p ton, seconds, $22; thirds, $21.
Talc—p. lb., Ground French, 1¼c.; Domestic, 6c.; per ton, $15; c. i. f. L'pool, p. ton, £4 5s.
Tungsten, metallic—p. oz., $4.
Vermilion—p. lb., American, 80@30c.; English, 55c.
Vitriol—blue, p. lb., ordinary, 4⅛@4¼c.; extra, 4¾c.
Zinc Oxide—p lb., American, dry, 3½@4c.; L'pool, p. ton, £17 10s.; Sulphate, £8 9s.

IMPORTS AT THE PORT OF NEW YORK, MAY 27TH TO JUNE 2D.

Antimony (star), 75 cks.; Regulus, 115 cks.
Barytes, 50 tons.
Brimstone, 1600 tons, also 13,000 cantars.
Cement, 5312 cks.
Gypsum, 180 cks.
Kainit, 500 tons, also 442 bags.
Iron Oxide, 241 bbls.
Pig-Iron, 875 tons.
Iron Ore, 2279 tons.
Spiegeleisen, 1103 tons.
Ferro-Manganese, 606 tons.
Scrap Iron, 200 tons.
Ocher, 185 cks.
Quicksilver, 200 flasks.
Steel Billets, 19,797.
Salt, 8259 sacks.
Saltpeter, 3229 bags.
Tin, slabs, 2486.
Spelter, 2240 plates.
Zinc Oxide, 50 bbls.

ENTERED FOR CONSUMPTION, MAY 27TH TO JUNE 2D.

Pig-Iron, 1100 tons.
Spiegeleisen, 1000 tons.
Iron Oxide 47,103 lbs.
Iron Ore, 840 tons.
Brimstone, 1700 tons, also 6500 cantars.
Barytes, 306 tons.
Manganese Ore, 307 tons.
Ferro-Manganese, 22 tons.
Cement, 6678 casks.
Chalk, 1785 tons.
Quicksilver, 100 bottles, 7600 lbs.
Kainit, 210 tons.
Manure salt, 233,686 lbs.
Saltpeter, 100,834 lbs.
Soda Ash, 2169 casks.
Zinc Oxide, 51,257 lbs.
Plaster, 900 tons.

WITHDRAWN FROM WAREHOUSE.

Antimony, 3360 pounds.
Cement, 840 casks.
Ferro-Manganese, 87 casks.
Iron, 2600 bars.
Lead, 1444 pigs.
Nitro-Benzole, 15 cs.
Saltpeter, 752 bags.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 4.

Iron Ore.—We quote at Cleveland, Ohio:

No. 1 Specular and Magnetic Bessemer ores, per ton	$6.25
No. 1 Specular (non-Bessemer) ores, per ton	5.50
Bessemer Hematites	$4.75@5.50
Non-Bessemer Hematites	4@4.50

In New York, foreign ores are worth 9@10c. per unit, according to quality.

American Pig.—This market is very quiet, standard brands remaining unchanged, and firmly held, while outside irons would have to shade quotations. The feeling here is not subject to the fluctuations that some other markets experience, and is now, perhaps, a little firmer than our correspondents report it in other centers.

We continue to quote for standard Lehigh brands, tide-water delivery: No. 1 X, Foundry, $18@$18.50; No. 2 X, Foundry, $17@$17.50; Gray Forge, $16@$16.50; while less popular brands sell 50c. or $1 below these figures, and fancy brands go as much above them.

Scotch Pig.—This market is very quiet, and we quote as follows: Coltness, $20; Gartsherrie, $19; Summerlee, $19.50; Dalmellington, $18@$18.75; Langloan, $19. Freights, 4@5s. Cables, to the Metal Exchange to-day quote: Coltness, 46s. 6d.; Summerlee, 45s. 6d.; Langloan, 43s. 6d; Gartsherrie, 42s.; Glengarnock, 42s.; Dalmellington, 40s.; Eglinton, 38s. 6d.; Warrants, 38s. 7d.; Middlesboro', No. 3, 29s. 4½d.

Bessemer Pig.—We quote Domestic at $18@$18.50 at the furnace, and Foreign, ex ship, $18.50@$19.

Spiegeleisen.—We quote English and German, $25.50@$25. Eighty per cent ferro-manganese is quoted at $63@$65.

Structural Iron and Steel.—Prices remain unchanged. We quote Angles, 1·90@2·10c. delivered; Tees, 2·40c.; Iron Beams and Channels, 3c. for American from dock. Steel Angles, 2·35@2·40c.

Plate Iron.—Common Tank, 2@2¼c.; Refined, 2¼c.; Flange Iron, 3¼@3·5c.; Extra Flange, 4@4·25c.

Bar Iron.—Refined we quote at 1·75@1·90c.; Common, 1·60@1·70c. Store prices are ·10@·20c. higher.

Steel Plates.—We quote 2½c. for Tank; 3@3¼c. for Boiler and Ship Plates; 3¼@3¾c. for Flanges; 4@4½c. for Extra Flange and Fire-Box Plate.

Merchant Steel.—American Tool Steel, 9½c.; special qualities, 11@18c.; Crucible Machinery, 4½@5½c.; Bessemer and Open-Hearth Machinery, 2½@2¾c.

Old Rails.—Tees and Double-Heads are offered at $18.50@$19. We hear of sales of several lots West and at Troy.

Steel Rails.—Sales have again amounted in the aggregate to over 12,000 tons during the week, at $34@$35. The reports of sales of foreign rails at New Orleans, that are circulating are based on a sale of 3000 tons to the Southern Pacific road, for use in Mexico. The price in bond in New Orleans was $23, which, had they been for use in this country, would have brought them to $40. In England the, f.o.b. price of this lot could scarcely have exceeded $19. Though no purchases of foreign rails have yet been made, it is by no means improbable some may be; for our Eastern rail mills are quite full of orders for the next six months, and some of them up to nearly the end of the year.

Scrap.—We quote $18.50@$19 in favor of buyers.

Philadelphia. June 3.

[From our Special Correspondent.]

The pig-iron market is extremely dull this week, the only business done being confined to very small lots, mainly of foundry iron. The most business done was in inferior makes, which have been offered at prices a little less than a week ago. The concession is about 25 cents, but is not enough to induce founders to buy more than they need for a short time. A further weakness is predicted in ordinary brands, and it is probable that considerable business will grow out of the crowding down of prices. In the special brands of iron, the supply in the iron market is rather light, and the makers are expecting to sell all they will have to offer at full prices. Quotations for No. 1 are $18.50 and $19 for standard, and $19.50@$20 for special. No. 2 iron is worth all the way from $16.50@$17.50, but very little has sold this week above $17. Forge iron is the lowest on the list, and is likely to be dull all this month. Offers were made of forge at something under $16, but without takers. Southern furnace-men have done business amounting to a few hundred tons.

Foreign Iron.—Bessemer iron is without any activity whatever.

Muck-Bars.—Quotations range from $28.50@$30, according to quality; business light.

Manufactured Iron.—Merchant Bars are selling from mills at $1.90 in a small way. Common iron is selling in 50 and 100-ton lots this week at $1.55@$1.60. There is no particular movement in the market, and every thing is awaiting adjustment of the wages question. Manufacturers are inclined to believe that the summer demand will make up for the present dullness. The aggregate of business must be quite large throughout the eastern end of the State, as very little capacity has been idle.

Nails.—Nails are quoted at $2@$2.10, with reported shading for large orders. Stores are buying in small lots, and all the inducements offered have failed to bring out car-load orders. The Western nailers will probably re-enter the Amalgamated Association and go to work.

Merchant Steel.—There has been quite an active demand for specialties during the past few days.

Wrought-Iron Pipe.—Several good orders have been booked within a few days, and the demand is active at card rates.

Skelp Iron.—Inquiries are in for Skelp iron, and the capacity of mills is well sold up. Quotations are 1·80@1·90c.

Plate Iron.—Plate iron continues in active demand at 1·90@2c.; Tank, 2@2·10c., with considerable inquiries for small lots.

Structural Iron.—Angles are quoted at 1·90c.; Beams and Channels, 3c. The only business done is in a small way, but every thing looks favorable for the summer. It depends on the course that will be pursued by the builders of large enterprises in hand. It is thought there will be no serious obstruction. The wages question is generally settled, and a good many inquiries have been made that point to greater activity in the third quarter of the year than we have had in the second.

Steel Rails.—Steel rails are rather quiet this week at $34.50@$35. A few inquiries have been made for some 5000 or 10,000-ton lots. A leading authority here says that there are quite a number of requirements yet unfilled.

Old Rails.—Old rails are quoted at $19.50@$20.50. Offers are occasionally made at something less, but there is not much demand.

Scrap.—Selected scrap has fallen off 50 cents, and demand is light.

Pittsburg. June 3.

[From our Special Correspondent.]

We have nothing of special interest. At this time, business generally is at a stand-still, waiting on coming events. In some departments, there is weakness; in others, demoralization; while in other directions, there is great steadiness, and in some branches absolute firmness.

Pig-Iron.—Sales will be limited in amount for some weeks to come, until the scale that will be presented to the manufacturers for acceptance on the first of July has been adjusted. Prices show no particular changes since last report. Common grades, as usual, are offered at various prices. The better grades are held firmly, and no concessions offered in order to effect sales.

Lake Ore.—We report sales of 10,000 tons to a Pittsburg furnace. On wharf at Cleveland, $3.60 a ton; freight from that point to Pittsburg, $1.50 a ton, 25 cents per ton increase on last year's prices.

Muck-Bar.—Demand fell off. We quote nominally $27.50@$27.75 cash and 4 months.

Steel Bloom Ends.—Decline noted in our last maintained.

Old Rails.—Decline checked. Sales reported $20.50 cash.

Wrought Scrap.—Weak. No. 1 offered $18; No. 2, $14.50 a ton.

Spiegel.—Declined. Sales, $27.50@$28 a ton.

Pig-Iron.—Following are the current rates:

Coke or bituminous:	$	$
Foundry No. 1	17.50@	18.00
Foundry No. 2	16.75@	17.25
Gray F., No. 3	15.50@	16.00
" No. 4	15.25@	15.50
White	14.50@	15.00
Mottled	15.00@	15.50
Silvery	15.50@	18.50
Bessemer	19.00@	19.50
Charcoal:		
Foundry No. 1	21.50@	23.00
Foundry No. 2	20.00@	20.50
Cold-Blast	25.00@	28.00
Warm-Blast	18.00@	24.00

	$	$
20 p. c. Spiegel.	27.50@	28.00
Muck-Bar	27.50@	27.75
Steel Blooms	31.00@	36.00
Steel Slabs	29.00@	33.00
Steel Crop Ends	23.00@	.....
St'l Bl'm Ends	21.50@	22.00
Old Iron Rails	20.50@	.....
Old Steel Rails	21.00@	21.50
No. 1 W. Scrap	18.00@	.....
No. 2 W. Scrap	14.50@	.....
Steel Rails	36.00@	.....
" light sect's	35.00@	42.00
Bar Iron	1.70@	1.75
Iron Nails	2.15@	2.20

PITTSBURG SALES.

250 tons	Neutral Forge	$16.25	4 mos.
150 "	Foundry. No. 1 Lake ore	18.25	cash.
300 "	G. F. Native ore	16.00	"
100 "	No. 2 Mill	15.75	"
100 "	No. 2 Foundry	17.00	"
500 "	Muck-Bar	27.25	
1,000 "	Old T rails	20.50	

Louisville. June 2.

[Reported by GEORGE H. HULL & Co.]

The market for pig-iron is quiet and without change of note in price. Some furnaces that are largely contracted ahead are having all they can do to keep up their contracts. Others are shipping to Eastern seaports, and accumulations at furnaces as a general thing are light.

We look for a stiff market if furnaces do not stop running in view of the expected strike next month.

We quote for cash as below:

PIG-IRON.

Southern Coke, No. 1 Foundry	$17.00@$17.50
" " No. 2 "	16.00@ 16.50
Hanging Rock Coke, No. 1, Foundry	16.50@ 17.00
" " Charcoal, No. 1 Foundry	19.00@ 20.00
Southern Charcoal, No. 1 Foundry	17.50@ 18.50
Southern Coke, No. 1 Mill, Neutral	15.00@ 15.50
" Charcoal, No. 1 Mill	17.00@ 17.50
White and Mottled, different grades	13.00@ 14.00
Southern Car-Wheel, Standard Brands	25.00@ 26.00
Hanging Rock, Cold Blast	25.00@ 26.00
" " Warm Blast	20.00@ 21.00

St. Louis. June.

[Reported by ROGERS, BROWN & Co.]

We quote for cash f. o. b.:

Missouri Charcoal Foundry	$17.25@$18.25
Southern " "	17.50@ 18.50
Southern No. 1 Coal and Coke Foundry	18.25@ 18.75
" No. 2 " " " "	17.25@ 17.75
Ohio Softeners " " " "	17.00@ 20.00
Missouri Mill Iron	16.00@ 17.00
Southern " "	15.00@ 16.00
Southern Car-Wheel and Malleable Irons	20.00@ 25.00
Lake Superior Car-Wheel and Malleable Irons	21.00@ 23.00
Old Rails, say	19.00@ 21.00
Old Wheels, say	15.00@ 16.50
Connellsville Coke (East St. Louis)	....@ 5.65

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 4.

Statistics.

The report of the total output of coal from the mines on the line of the Chesapeake & Ohio Railroad for the week ended May 21st, 1886, and year from January 1st, is as follows: 1886, week, 17,111 tons; year, 454,087 tons. 1885, week, 21,762 tons; year, 435,499 tons. Decrease, 1886, week, 4651; increase, year, 18,588 tons.

Production Anthracite Coal for week ended May 29th, and year from January 1st:

TONS OF 2240 LBS.	1886.		1885.	
	Week.	Year.	Week.	Year.
P. & Read. RR. Co.	155,633	4,048,906	140,701	3,705,868
L. V. RR. Co.	76,416	2,390,154	101,548	1,914,192
D. L. & W. RR. Co.	58,877	2,036,651	71,256	1,505,516
D. & H. Canal Co.	62,474	1,443,665	87,494	1,098,565
Penna. RR.	50,352	1,274,142	57,881	1,206,999
Penna. Coal Co.	22,253	475,951	30,060	466,190
Penna. Canal Co.	12,139	95,501	11,964	68,542
Total	437,144	11,764,970	500,904	9,964,872
Increase		1,800,098		
Decrease	63,760			

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1881	9,693,057	1883	11,606,453
1882	9,520,085	1884	11,430,860

The Norfolk & Western Railroad Company reports the shipments of Pocahontas Flat-Top coal for the week ended May 29th, 1886, and year from January 1st as follows, tons of 2000 pounds: 1886—Week, 14,281; year,

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.			Dividends. Total paid to date.	Dividends. Date and amount per share of last.		
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*	.....	.....	.....	$382,500	May	1886	.15
2	Alice, s. c.	Mont	10,000,000	400,000	25	*	.....	.....	.....	700,000	Mar.	1886	.06¼
3	Amie Con., s. L.	Colo.	5,000,000	500,000	10	*	.....	.....	.....	330,000	Oct.	1883	.05
4	Atlantic, c.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	320,000	Jan.	1886	$1.00
5	Argents, s	Nev.	10,000,000	100,000	100	295,000	July	1885	.10	40,000	Feb.	1880	.20
6	Barbee & Walker, s.	Utah	1,000,000	100,000	10	*	.....	.....	.....	60,000	Nov	1880	.10
7	Bassick, G. s.	Colo.	10,000,000	100,000	100	*	.....	.....	.....	400,000	Mar.	1884	1.00
8	Belle Isle, s.	Nev..	10,000,000	100,000	100	140,000	May	1886	.10	300,000	Dec.	1879	.25
9	Belcher, G. s.	Nev..	10,490,000	104,900	100	2,217,335	ec.	1885	.30	15,397,000	Apl.	1876	1.00
10	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	26,250	Dec.	1883	10	87,500	Dec.	1885	.10
11	Big B'nd Hydraulic, G	Dak..	1,000,000	200,000	5	*	.....	.....	.....	102,000	Apl.	1886	.03
12	Black Bear, G.	Cal..	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
13	Bodie Con., G. s.	Cal..	10,000,000	100,000	100	274,990	Dec.	1883	.50	1,602,572	Apl.	1885	.50
14	Bonanza Developm't	C & M	3,000,000	300,000	10	.....	.....	.....	.....	135,000	Oct.	1882	.15
15	Bonanza K'g, Cons. s.	Cal..	1,000,000	100,000	10	*	.....	.....	.....	185,000	Feb.	1885	.10
16	Boston & Mont, G.	Mont	2,000,000	200,000	10	*	.....	.....	.....	490,000	May	1886	.15
17	Breece, s.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	2,000	Feb.	1880	.01
18	Brooklyn Lead, L. S.	Utah	500,000	.....	.....	.....	.....	.....	.....	95,000	Jun.	1886	.05
19	Bulw'r, G.	Cal	1,000,000	100,000	100	40,000	Oct.	1885	.20	175,000	Jan.	1884	.10
20	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	40,000	Feb.	1886	.10
21	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	.....	.....	.....	.....	27,350,000	Jan.	1886	5.00
22	Carbonate Hill, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	80,000	Apl.	1884	.05
23	Caribou Con., s.	Colo.	1,500,000	150,000	10	*	.....	.....	.....	50,000	Mch	1880	.10
24	Castle Creek, G.	Idah.	100,000	100,000	1	.....	.....	.....	.....	51,000	Oct..	1883	.03
25	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*	.....	.....	.....	270,000	May	1884	.10
26	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,780,000	Jan.	1886	2.00
27	Christy, s.	Utah	10,000,000	100,000	100	.....	.....	.....	.....	10,000	Jun.	1885	.10
28	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	1,650,000	Dec.	1884	.25
29	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*	.....	.....	.....	102,500	Jun.	1886	.05
30	Cons. Cal. & Va., G. s.	Nev..	21,600,000	216,000	100	108,000	Jan.	1885	.20	64,800	Feb.	1886	.30
31	Con. Gold Mining, G.	Ga...	500,000	100,000	5	*	.....	.....	.....	108,000	Nov.	1883	.02
32	Contention, s.	Ariz.	12,500,000	250,000	50	.....	.....	.....	.....	†2,587,000	Dec.	1884	.25
33	Crescent, s. L. G.	Utah	15,000,000	600,000	25	‡	.....	.....	.....	180,000	Sept	1885	.05
34	Crown Point, G. s.	Nev..	10,000,000	100,000	100	2,675,000	Feb.	1882	.25	11,588,000	Jan.	1875	2.00
35	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*	.....	.....	.....	§900,000	Jan.	1887	.10
36	Derbec B. Grav., G. s.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	130,000	Apl.	1886	.10
37	Dunkin, s. L.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	220,000	Sept	1884	.05
38	Elkhorn, G. s.	Mont	1,000,000	100,000	10	50,000	July	1883	.50	115,000	Apl	1886	.50
39	Eureka Con., G. s. L.	Nev..	5,000,000	50,000	100	450,000	Apl.	1886	1.00	4,817,500	July	1882	.25
40	Evening Star, s. L.	Colo.	500,000	50,000	10	*	.....	.....	.....	1,400,000	Nov	1883	.50
41	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
42	Father de Smet, G.	Dak..	10,000,000	100,000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
43	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun	1871	.....	480,000	Dec.	1885	1.00
44	Freeland, G. s. c.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	170,000	Apl	1886	.10
45	Fresno Enterprise, G	Cal..	5,000,000	100,000	50	.....	Mch	1883	.10	110,000	July	1882	.10
46	Gould & Curry, G. s.	Nev..	10,300,000	108,000	100	3,947,000	Mar.	1886	.40	3,826,000	Oct.	1870	10.00
47	Grand Central, s.	Ariz.	1,000,000	100,000	10	.....	.....	.....	.....	625,000	Dec.	1882	.25
48	Grand Prize, s.	Nev..	10,000,000	100,000	100	570,000	Apl.	1886	.40	495,000	Mar.	1884	.25
49	Granite, s.	Colo.	125,000	125,000	1	.....	.....	.....	.....	6,250	May	1883	.01
50	Granite Mountain, s.	Mont	10,000,000	400,000	25	.....	.....	.....	.....	1,000,000	May	1886	.25
51	Green Mountain, G.	Cal..	1,250,000	125,000	10	*	.....	.....	.....	212,000	Nov.	1881	.07½
52	Hale & Norcross, G. s	Nev..	11,220,000	112,000	100	4,874,000	May.	1886	.50	1,598,000	Apl.	1871	5.00
53	Hall-Anderson, G.	N. S.	150,000	150,000	1	.....	.....	.....	.....	7,000	Jan.	1882	.05
54	Hecla Con., G. s. L. C.	Mont	1,500,000	30,000	50	*	.....	.....	.....	1,002,000	May	1886	.50
55	Hel'a Mg & Red, G. s. L.	Mont	3,315,005	663,000	5	*	.....	.....	.....	158,250	Jan.	1886	.03
56	Holmes, s.	Nev..	10,000,000	100,000	100	350,000	May	1886	.50	75,000	Apl.	1886	.25
57	Holyoke, G.	Idah.	200,000	200,000	1	.....	.....	.....	.....	27,000	Feb.	1883	.10
58	Homestake, G.	Dak.	12,500,000	125,000	100	900,900	July	1878	1.00	3,338,750	May	1886	.40
59	Honorine, s. L.	Utah	5,000,000	250,000	2	25,000	Jun.	1883	....	62,500	Nov.	1885	.05
60	Hope, s.	Mont	400,000	8,000	50	*	.....	.....	.....	158,252	Oct..	1884	1.50
61	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*	.....	.....	.....	4,000,000	Nov.	1884	.50
62	Idaho, G.	Cal..	310,000	3,100	100	.....	.....	.....	.....	3,899,800	Dec.	1885	7.50
63	Independence, s.	Nev..	10,000,000	100,000	100	320,000	Aug.	1885	.20	225,000	Sept	1879	.25
64	Indian Queen, s.	Nev..	250,000	125,000	2	.....	.....	.....	.....	368,750	July	1883	.03
65	Inyo, G.	Cal..	500,000	100,000	5	*	.....	.....	.....	45,000	Apl.	1882	.05
66	Iron Hill, s.	Dak.	2,500,000	25,000	50	82,500	Oct.	1885	.....	62,500	May	1886	.10
67	Iron-Silver, s. L.	Colo.	10,000,000	500,000	0	*	.....	.....	.....	1,600,000	Apl.	1886	.20
68	Jackson, G. s.	Nev.	5,000,000	50,000	100	10,000	Nov.	1880	.20	35,000	Mar.	1886	.10
69	Jocuistita, s.	Mex.	2,500,000	250,000	10	.....	.....	.....	.....	1,200,000	Feb.	1885	.50
70	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881	.30	1,350,000	July	1884	.10
71	La Plata, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	610,000	Sept	1882	.30
72	Leadville Cons., s. L.	Colo.	4,000,000	400,000	10	*	.....	.....	.....	390,000	May.	1886	.05
73	Lexington, G. s.	Mont	4,000,000	40,000	100	*	.....	.....	.....	565,000	Jan.	1885	2.00
74	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	780,000	Mch	1885	.10
75	Little Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*	.....	.....	.....	1,050,000	Mch	1880	.50
76	Manhattan, s.	Nev.	5,000,000	50,000	100	150,000	July	1879	1.00	437,500	Feb	1886	.25
77	Marguerite, G.	Cal..	500,000	25,000	20	.....	.....	.....	.....	18,750	Oct.	1882	.25
78	Martin White, s.	Nev.	10,000,000	100,000	100	1,150,000	Mar.	1886	.25	90,000	July	1879	.30
79	Minnesota, C.	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1.00	1,826,000	Mar.	1876	.....
80	Mono, G.	Colo.	5,000,000	5,000	100	560,000	Jun.	1885	* .50	12,500	Mar.	1886	.25
81	Montana, Lt., G. s.	Mont	3,300,000	330,000	10	*	.....	.....	.....	301,950	Jan.	1886	.37½
82	Morning Star, s. L.	Colo.	1,000,000	100,000	10	*	.....	.....	.....	150,000	Sept	1885	.25
83	Moulton, s. G.	Mont	2,000,000	400,000	5	*	.....	.....	.....	260,000	Mar	1886	.07½
84	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	.....	.....	105,000	Mar.	1884	.10
85	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	80,000	July	1885	.20
86	Napa, Q.	Cal..	700,000	100,000	7	.....	.....	.....	.....	290,000	Jan.	1883	.10
87	Navajo, G. s.	Nev..	10,000,000	100,000	100	395,000	Mar.	1886	25	325,000	Feb.	1885	.25
88	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½	*	.....	.....	.....	30,000	Dec.	1885	.06½
89	New York Hill, G.	Cal..	5,000,000	50,000	100	62,500	Oct.	1885	.15	215,000	Aug.	1882	.10
90	Northern Belle, s.	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	Apl.	1883	50
91	North Belle Isle, s.	Nev..	10,000,000	100,000	100	150,000	Mar	1886	.20	30,000	Aug.	1881	.15
92	Ontario, s. L.	Utah	15,000,000	150,000	100	.....	.....	.....	.....	7,400,000	May.	1886	.50
93	Ophir, G. s.	Nev..	10,000,000	100,000	100	3,932,800	Feb.	1886	30	1,595,000	July	1882	1.00
94	Original, s. C.	Mont	1,500,000	60,000	25	*	.....	.....	.....	114,000	Oct..	1884	.05
95	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	972,500	Sept	1884	.25
96	Oxford, G.	N. S.	125,000	125,000	1	*	.....	.....	.....	34,500	Oct.	1885	.02
97	Paradise Valley, G. s.	Nev.	10,000,000	100,000	100	47,000	Mar.	1882	.15	61,000	Feb..	1886	.10
98	Pleasant Valley, G. s.	Cal.	10,000,000	100,000	100	40,000	Mar.	1884	.10	30,000	Dec.	1882	.05
99	Plutus, G. s. C. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	20,000	Feb.	1886	.10
100	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	.....	.....	.....	1,675,000	May	1883	.25
101	Prussian, s. L.	Colo	1,500,000	150,000	10	.....	.....	.....	.....	132,000	Jan	1883	.10
102	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100	.....	.....	.....	.....	731,400	Feb.	1886	1.50
103	" com., Q.	Cal.	5,700,000	57,000	100	.....	.....	.....	.....	151,000	July	1882	.40
104	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862	.....	4,330,000	Jan.	1886	4.00
105	Richmond, s. L.	Nev..	1,350,000	54,000	25	*	.....	.....	.....	4,177,587	May	1886	1.25
106	Ridge, C.	Mich.	500,000	20,000	25	220,000	Mar.	1886	.50	10,000	Feb.	1880	.50
107	Rising Sun, s.	Dak.	750,000	150,000	5	*	.....	.....	.....	52,000	May	1881	.07½
108	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	585,000	Mar.	1886	.05
109	Robert E. Lee, s. L.	Colo.	10,000,000	500,000	20	.....	.....	.....	.....	100,000	Dec.	1882	.10
110	Rooks, G.	Vt...	500,000	50,000	10	*	.....	.....	.....	61,000	Apr	1885	.30
111	San Francisco, C.	Cal..	5,000,000	50,000	100	45,000	Sept	1880	.50	20,000	Feb.	1883	.05
112	Savage, s.	Nev..	11,200,000	112,000	100	6,100,000	Jan.	1886	.50	4,480,000	July	1869	3.00
113	Security L. Mg, Mfg.	Colo.	1,000,000	100,000	10	*	.....	.....	.....	50,000	July	1884	.....
114	Shoshone, G.	Idah.	150,000	150,000	1	.....	.....	.....	.....	7,500	Apl.	1883	.01
115	Sierra Buttes, G.	Cal..	225,000	22,500	10	.....	.....	.....	.....	1,430,639	Apl.	1886	.25
116	Sierra Grande, s.	N. M.	2,500,000	500,000	5	.....	.....	.....	.....	869,000	Sept	1884	.25
117	Sierra Nevada, G. s.	Nev	10,000,000	100,000	100	5,947,698	May	1886	.25	102,000	Jan.	1871	1.00
118	Silver Cord, G. s. L.	Colo.	5,000,000	500,000	10	.....	.....	.....	.....	225,000	Nov.	1883	.25
119	Silver King, s.	Ariz.	10,000,000	100,000	100	*	.....	.....	.....	1,675,000	May.	1886	.25
120	Silverton, G. s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	58,000	Jun.	1886	.02
121	Small Hopes, Cons., s.	Colo.	5,000,000	250,000	20	*	.....	.....	.....	2,050,000	May.	1886	.25
122	Smuggler, s. L.	Colo.	600,000	60,000	10	.....	.....	.....	.....	66,700	Aug.	1883	.25¾
123	Socorro, C.	N. M.	250,000	2,500	100	.....	.....	.....	.....	4,000	Mch	1882	.00
124	South Yuba, G.	Cal..	2,000,000	40,000	50	*	.....	.....	.....	150,000	Oct.	1881	.75
125	Spring Valley, G.	Cal..	200,000	200,000	1	*	.....	.....	.....	50,000	Jan.	1881	.25
126	Standard, G. s.	Cal..	10,000,000	100,000	100	25,000	Oct.	1884	.25	4,425,000	Mar.	1884	.25
127	Stormont, s.	Utah	500,000	500,000	1	*	.....	.....	.....	155,000	Nov.	1881	.05
128	St. Joseph, L.	Mo..	1,100,000	110,000	10	*	.....	.....	.....	493,000	Dec.	1885	.20
129	Syndicate, G.	Cal..	10,000,000	100,000	100	38,729	July	1882	.15	48,398	Sept	1885	.10
130	Tip Top, s.	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
131	Tombstone, G. s. L.	Ariz	12,500,000	500,000	25	*	.....	.....	.....	1,250,000	Apl.	1882	.10
132	True Fissure, G. s. L.	Utah	1,500,000	150,000	10	*	.....	.....	.....	75,000	Jun.	1883	.15
133	United Verde, C.	Ariz.	3,000,000	300,000	10	*	.....	.....	.....	97,500	Feb.	1884	.20
134	Valencia, M.	N. H.	150,000	1,500	100	*	.....	.....	.....	41,250	Apl.	1886	2.50
135	Vizina, s.	Ariz.	5,000,000	200,000	25	*	.....	.....	.....	140,000	Apl.	1882	.10
136	Yellow Jacket, G. s.	Nev..	12,000,000	120,000	100	5,448,000	Dec.	1885	.75	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.			
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*	.....	.....	.....	
2	Albion, s. L.	Nev..	15,000,000	150,000	100	$577,000	July	1885	.50	
3	Allouez, C.	Mich	2,000,000	80,000	25	240,000	Feb.	1884	.50	
4	Alpha Con., G. s.	Nev..	3,000,000	30,000	100	430,000	Mar	1886	.50	
5	Alta, s.	Nev..	10,080,000	100,800	100	1,951,400	Feb.	1886	.25	
6	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	Jun.	1877	.25	
7	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....	
8	Barcelona, G.	Nev..	5,000,000	200,000	25	*	.....	.....	.....	
9	Battle Creek, G.	Dak.	5,000,000	200,000	25	.....	.....	.....	.....	
10	Bear Creek.	Cal..	300,000	300,000	1	.....	.....	.....	.....	
11	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	n.	1883	.10	
12	Belvidere.	Cal..	.....	60,000	.....	92,000	b.	1882	.15	
13	Belmont, s.	Nev..	5,000,000	50,000	100	735,000	Apl.	18 6	.10	
14	Best & Belcher, G. s.	Nev..	10,080,000	100,800	100	1,647,790	Jan.	1886	.50	
15	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*	.....	.....	.....	
16	Black Jack, G.	Cal..	250,000	100,000	2½	.....	.....	.....	.....	
17	Bonanza Chief	Mon	1,000,000	1,000,000	1	*	.....	.....	.....	
18	Bondholder.	Colo.	500,000	200,000	2½	.....	.....	.....	.....	
19	Boston Con., G.	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25	
20	Bradshaw, s.	Ariz.	2,250,000	225,000	10	.....	.....	.....	.....	
21	Buckeye.	Colo.	2,000,000	400,000	5	*	.....	.....	.....	
22	" preferred.	Colo.	.....	.....	.....	.....	.....	.....	.....	
23	Bull-Domingo, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	
24	Bullion, G. s.	Nev..	10,000,000	100,000	100	4,570,000	July	1885	.25	
25	Bye and Bye.	Ariz.	1,000,000	100,000	10	*	.....	.....	.....	
26	Calaveras, G.	Cal..	500,000	500,000	1	*	.....	.....	.....	
27	Cal. W'r & M. Co., G.	Cal..	.....	.....	.....	.....	.....	.....	.....	
28	Castle Creek, G.	Idah.	.....	.....	.....	.....	.....	.....	.....	
29	Catskill, s.	Nev..	1,500,000	300,000	5	.....	.....	.....	.....	
30	Central Arizona, s.	Ariz.	10,000,000	100,000	100	.....	.....	.....	.....	
31	Cherokee, G.	Cal..	1,500,000	150,000	10	.....	.....	.....	.....	
32	Chollar, s.	Nev..	11,200,000	112,000	100	984,000	May	1886	.50	
33	Climax, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	
34	Colorado No. 2, s. L.	Colo.	100,000	10,000	10	.....	.....	.....	.....	
35	Con. Imperial, G. s.	Nev..	50,000,000	500,000	100	1,050,000	May	1885	.10	
36	Con. Pacific, G.	Cal..	6,000,000	60,000	100	174,000	Feb.	1886	.15	
37	**Cop. Queen Cons, C.	Colo.	1,400,000	140,000	10	.....	.....	.....	.....	
38	Crescent, s. L.	Colo.	3,000,000	300,000	10	.....	.....	.....	.....	
39	Crocker, s.	Ariz.	10,000,000	100,000	100	65,000	May	1886	.20	
40	Crowell. G.	N. C.	500,000	500,000	1	.....	.....	.....	.....	
41	Dahlonega, G.	Ga...	250,000	250,000	1	*	.....	.....	.....	
42	Dardanelles, G.	Cal..	1,000,000	100,000	10	.....	.....	.....	.....	
43	Decatur, s.	Colo.	1,500,000	300,000	5	*	.....	.....	.....	
44	Denver City, s. L.	Colo.	5,000,000	500,000	10	*	.....	.....	.....	
45	Denver Gold.	Colo.	300,000	60,000	5	.....	.....	.....	.....	
46	Deseret, G. s.	Utah	500,000	50,000	10	*	.....	.....	.....	
47	Dunderberg, s.	Colo.	1,500,000	150,000	10	*	.....	.....	.....	
48	Durango, G.	Colo.	500,000	500,000	1	*	.....	.....	.....	
49	Eastern Dev. Co., Lt	N. S.	1,500,000	150,000	10	840,000	May	1885	.10	
50	Elko Con., s.	Nev..	.....	.....	.....	.....	Mar	1884	.15	
51	Empire Lt., G.	Mon.	500,000	100,000	5	.....	.....	.....	.....	
52	Empire, s.	Utah	10,000,000	100,000	100	.....	.....	.....	.....	
53	Enterprise, s. L.	Colo.	800,000	80,000	10	*	.....	.....	.....	
54	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*	.....	.....	.....	
55	Exchequer.	Nev.	10,000,000	100,000	100	840,000	Aug	1885	.20	
56	Garfield, Lt., G. s.	Nev.	500,000	100,000	5	.....	.....	.....	.....	
57	Globe Copper.	Ariz	.....	.....	.....	.....	.....	.....	.....	
58	Gold Placer, G.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	
59	Goodshaw, G.	Cal..	10,000,000	100,000	100	229,314	Dec.	1885	.25	
60	Grand Belt, C.	Tex.	12,000,000	120,000	100	*	.....	.....	.....	
61	Granville, G.	N. C.	300,000	300,000	1	*	.....	.....	.....	
62	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	.....	.....	.....	.....	
63	Gregory Con., G.	Mon.	3,000,000	300,000	10	*	.....	.....	.....	
64	Harlem M. & M. Co, G.	Cal..	1,000,000	200,000	5	.....	.....	.....	.....	
65	Head Cent. & Tr. s. G	Ariz.	10,000,000	100,000	100	.....	.....	.....	.....	
66	Hidalgo, s.	Mex.	200,000	20,000	10	.....	.....	.....	.....	
67	Highland, C.	Mich	500,000	25,000	25	.....	.....	.....	.....	
68	Hortense, s.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....	
69	Iroquois, C.	Mich	1,250,000	50,000	25	.....	.....	.....	.....	
70	J. D. Reymert.	Ariz	10,000,000	100,000	100	*	.....	.....	.....	
71	Julia Cons., G. s.	Nev..	11,000,000	110,000	100	1,438,000	Nov	1885	.10	
72	Kearsarge, C.	Mich	1,250,000	50,000	25	100,000	Apl.	1886	5.00	
73	Lacrosse, G.	Colo.	1,000,000	100,000	10	*	.....	.....	.....	
74	Lee Basin, s. L.	Colo.	5,000,000	500,000	10	*	Sept	1882	.25	
75	Leviathan, s.	Nev..	10,000,000	100,000	100	380,000	.....	.....	.....	
76	Lucerne, s.	Colo.	5,000,000	500,000	10	*	Jan.	1886	.10	
77	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec.	1881	.....	
78	Mariposa pref., G.	Cal..	5,000,000	50,000	100	1,687,500	Feb.	1883	.25	
79	" common, G.	Cal..	10,000,000	100,000	100	1,975,000	Dec.	1881	.20	
80	May Belle, G.	Cal..	10,000,000	100,000	100	84,000	Mar	1884	.15	
81	Mayflower, s.	Nev..	1,000,000	100,000	100	60,000	Feb.	1886	.25	
82	Mexican, G. s.	Nev.	10,000,000	100,800	100	2,540,560	.....	.....	.....	
83	Michoacan Synd.	Mex.	.....	.....	.....	.....	.....	.....	.....	
84	Mike & Starr, s. L.	Colo.	1,000,000	200,000	5	*	.....	.....	.....	
85	Miner Boy, G. s. L.	Colo.	5,000,000	500,000	10	*	.....	.....	.....	
86	Miller.	Nev	5,000,000	200,000	25	.....	.....	.....	.....	
87	Moose Silver, s.	Colo.	3,000,000	300,000	10	*	.....	.....	.....	
88	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	
89	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov	.....	.....	
90	Noonday.	Cal..	600,000	60,000	10	208,000	Dec.	1881	.10	
91	Old Dominion, C.	Ariz.	3,000,000	300,000	10	.....	.....	.....	.....	
92	Oriental.	Nev..	2,000,000	200,000	10	.....	.....	.....	.....	
93	Oriental & Miller, s.	Nev..	10,000,000	400,000	25	.....	.....	.....	.....	
94	Overman, G. s.	Nev..	11,520,000	115,200	100	3,685,040	Apl.	1886	.20	
95	Parrott, C.	Mon.	1,800,000	180,000	10

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	May 29.		May 31.		June 1.		June 2.		June 3.		June 4.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.							1.80						100
Amie Con., Co.	.04								.04				3,900
Argenta													
Bassick, Co.									.08				100
Belle Isle, Ne.							.25	.22	.25				1,400
Bodie Cons., Ca.	1.45				1.50		1.40		1.55		1.50	1.45	2,800
Breece													
Bulwer, Ca.	1.85				2.00	1.90	1.70		1.90	1.70			5,850
Cal. B. H.											1.00		100
Chollar													
Chrysolite, Co.	.50												200
Colorado Central									2.45	2 40			400
Cons. Cal. & Va., Ne.	1.55	1.50			1.50	1.45	1.45	1.40	1.50	1.45	1.50	1.35	6,733
Crown Point													
Deadwood Terra											3.00		200
Eureka Cons., Ne.	2.20				2.20		2.15						810
Father de Smet, Dk.													
Freeland													
Gold Stripe, Ca.													
Gould & Curry, Ne.							1.00						1,000
Grand Prize, Ne.													
Green Mountain, Ca.													
Hale & Norcross, Ne.	2.00				1.95	1.90			2.00		2.00		1,550
Hall-Anderson, N. S													
Homestake, Dk.	20.50								21.00	20 13			500
Horn-Silver, Ut.	2.75				3.00		2 80				3.00		1,150
Independence, Ne.													
Iron Silver, Co.							1.90						100
Leadville C., Co.													
Little Chief, Co.													
Little Pittsburg, Co.	.95												400
Martin White, Ne.													
Moulton													
Navajo, Ne.													
North Belle Isle, Ne.													
Ontario, Ut							29.75	29.00					120
Ophir													
Osceola													
Plymouth											14.00		100
Quicksilver Pref., Ca.							4.50						
" Com., Ca.													100
Quincy													
Robinson Cons., Co.									.50		.50		700
Savage, Ne.					1.05		.95	.90	.85		1.00	.95	1,200
Sierra Nevada, Ne.	.40						.38				.42		1,600
Silver King, Ar.													
Spring Valley, Ca.													
Standard, Ca.													
Stormont, Ut.							.14						500
Tip Top, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES
	May 29.		May 31.		June 1.		June 2.		June 3.		June 4.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion													
Alta													
American Flag													
Barcelona, g.													
Bechtel Con., g.													
Belvidere													
Belcher													
Best & B'icher, g. s.													
Big Pittsburg, s. l.													
Bowman Silver													
Bull-Domingo, s.l.													
Central Ariz'na, s.													
Chollar													
Cons. Imperial													
Con. Pacific													
Cusi													
Decatur													
Durango, g.													
Eastern Oregon													
Goodshaw, g.													
Harlem M. & M. Co.													
Harshaw													
Kossuth													
Lacrosse, g.	.08	.07			.08						.08		4,600
Mariposa Pref., g.													
" Com., g.													
Mexican, g. s.											.45		800
Mono													
New Pittsburg													
North Standard, g.													
N. Horn-Silv'r, s l.													
Pri'nt'l & Miller, s													
Plutus													
Potosi													
Rappahannock, g							.12	.11				.11	3,600
Red Elephant, s.													
Ridge													
Silver Cliff, s.													
Sonora Con.													
South Bodie, g.													
South Bulwer, g.													
South Hite													
South Pacific													
State Line, 1 & 4, s.													
" Nos. 2 & 3, s.													
Sutro Tunnel	.11						.11		.11	.10	.11		3,300
Tamarack													
Tioga													
Unadilla, s													
Union Cons., g. s.	.45						.47					.47	2,900
Utah													

Dividend shares sold, 31,613. Non-dividend shares sold, 15,650.

332,403. 1885—Week, 10,039; year, 217,878. Increase, 1886—Week, 4,242; increase, year, 114,525.

Production Bituminous Coal for week ended May 29th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1886.		1885.	
	Week.	Year.	Week.	Year.
Phila. & Erie RR.	...	7.464	54	14,180
*Cumberland, Md.	59,442	458,493	62,788	1,061,989
*Barclay, Pa.	4,463	85,924	3,924	102,998
*Broad Top, Pa.				
H. & Broad Top RR.	9,192	160,370	3,163	73,356
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe	200	35,380	2,370	75,014
Karthaus (Keating)	807	49,193	2,326	56,801
Tyrone & Clearfield	16,975	658,333	49,168	1,273,068
Alleghany Region, Pa.				
Gallitzin & Mountain	21,314	355,589	9,692	209,935
Total	112,393	1,810,746	133,485	2,866,341

* Tons of 2240 lbs.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.				
West Penn RR.	9,059	130,149	3,830	115,362
SouthwestPenn. RR.	3,751	84,017	1,776	45,119
Pennsylvania RR.	8,146	93,779	4,332	78,616
Westmoreland Region, Pa.				
Pennsylvania RR.	8,356	369,675	31,587	391,431
Monongahela Region, Pa.				
Pennsylvania RR.	11,844	131,114	3,820	83,890
Total	41,156	808,734	45,345	714,418
Grand total	153,549	2,619,480	178,830	3,610,759

Production of Coke on line of Pennsylvania RR. for week ended May 29th, and year from January 1st:

Tons of 2000 pounds.

	1886.		1885.	
	Week.	Year.	Week.	Year.
Alleghany Region.	3,626	85,307	2,880	76,539
West Penn. RR.	1,538	42,041	1,064	15,953
Southwest Penn. RR	1,440	943,696	38,368	789,615
Penn. & W. Region	5,717	132,006	4,667	96,650
Monongahela	1,690	46,111	2,843	38,022
Pittsburg Region.	.....	.....	.....	.....
Snow-Shoe	50	9,345	241	6,287
Total	74,061	1,258,506	50,063	1,023,065

Anthracite.

Reference was made in our last issue to the reported sales by Messrs. Ward & Olyphant at April prices, and the impression in the trade that the Delaware & Hudson Canal Company was thus in a way cutting the market. We are officially informed that the Delaware & Hudson's "net" prices in April were $3 for Grate and Egg, $3.40 for Stove, $3.15 for Chestnut, f.o.b. Weehawken, which, as our readers know, were above the prices of other companies, and are above present standard prices, and consequently the selling at April prices was above, and not below, the market. In fact, this company emphatically denies that it either has or will "cut" prices in an underhand way. We have already had occasion several times to congratulate the company on the straightforward and open manner in which it has reduced or advanced prices as occasion required. The company sells exclusively through Messrs. Ward & Olyphant, and their prices are therefore the company's *net* prices.

During the week under review, the business done has been very small, and all indications favor a continuance, for some time to come, of a dull state of trade. Prices are, in some cases, a shade worse than they were a week ago. Stocks with the companies are not large, and upon the whole are not increasing much, if at all. The Reading Company decreased its supply of coal at Port Richmond about 16,000 tons last week. It is claimed that the "companies" are generally standing firmly to circular prices. At all events, if they are cutting, they are doing it in a very secret manner.

Whenever trade gets dull, the individual operators are likely to appear prominently as sellers at concessions from established quotations, and some of them, driven by financial wants, occasionally sell coal at very marked concessions, and at times at what appear to be unnecessarily low prices. When the market is as circumscribed as it is at present, there is no question that the coals of the individual operators (who furnish about one half of the entire production) make the market. However, when it is stated at such times that coal can be purchased at a low price, there are many who will remark, "But you can't get any of the companies' coals at such a price." The fact that "a company" sells a coal is no guarantee either of quality or preparation. The large companies have a great many collieries, some of which furnish very superior coal, and some very poor. Some of the breakers are new, with all modern improvements for preparation, and some very old, and doing but indifferent work. The collieries of the so-called individual operators are interspersed throughout the regions, and embrace both good and poor coals and modern and old breakers, while in preparation the results should, if any thing, favor the individual management. Because individual operators are sometimes compelled to slaughter their coal is no reason why said coal is not a good purchase. Some of the arguments used by salesmen to force coal upon buyers would be very weak with those familiar with the coal-fields and the operations at the mines.

In an interview with a Philadelphia *Inquirer* reporter, Mr. Franklin B. Gowen says: More money could be made by a proper management of the coal trade in harmony with the other companies than in a fight. But if there is to be harmony, so that other companies make money, the Reading should make some too. No combination is a good one for the Reading unless prices compensate for the restriction of tonnage. At present prices and without restriction, the Reading could make $1,100,000 a month. If all the other companies restricted, the Reading could afford to do so too, if better prices were to be gained thereby. The difficulty is, that the Reading agrees with the other companies to take low prices and then restricts production, while its principal competitor, the Pennsylvania Railroad, is untrammeled. If the restriction in the spring by the Reading kept the market bare, so that in the fall the receivers could get high prices and large tonnage, there might be a show of reason for the policy of low prices and restriction in the spring; but if the Pennsylvania Railroad keeps the Reading customers full of coal all the time, the receivers will find when autumn comes that their able and enterprising antagonist has taken time by the forelock and filled up the bins of their customers. The whole thing in a nutshell is that, while restriction and high prices should go together, or else low prices and plenty of tonnage, the receivers are trying to see if they can't manage to make low prices and restriction fit together.

The above contains some good food for thought for those who are parties to the present coal combination. At the same time, it may be said that, if there was no restriction, the Reading Company could not secure even "present prices," therefore could not make $1,100,000 a month.

We quote ordinary free-burning coals f. o. b. as follows:

	Week ended		
	June 4.	May 28.	May 21.
Lump	$3.10@ ...	$3.0 @	$3.00@ ....
Steamboat	3.00@	3.00@	3.00@ ....
Broken	2.85@ 2.90	2.90@	2.90@ $3.00
Egg	2.85@ 2.90	2.90@	2.90@ 3.00
Stove	3.20@ 3.40	3.10@ 3.40	3.10@ 3.40
Chestnut	2.75@ 3.00	2.75@ 3.00	2.80@ 3.00
Pea	1.90@ 2.00	1.90@ 2.00	1.85@ 2.10
Buckwheat	1.50@ 1.80	1.75@ ...	1.55@ 1.75
Dust	1.15@ 1.25	1.25@	1.25@ 1.35

We have not heard of any sales of good stove coal at $3.10 here this week, although reports come from

the East of such a price being made here. We have heard of inferior stove down to $3. Lehigh Buckwheat has sold down to $1.35 a ton, or about the freight charges. The Pennsylvania Coal Company dropped its price on Stove coal 10 cents a ton on coal shipped prior to June 20th. This is looked upon in the trade as "irregular."

Bituminous.

There is but little demand for this class of coal except upon contracts, the usual current trade having apparently filled up with anthracite or the cheap bituminous coals. Prices are very low already, and have a downward tendency still. The poorer Pennsylvania coals can be purchased at about $2.65 alongside here, while the best Clearfield coal is obtainable at $3, and Cumberland at $3.10@$3.25. We hear of sales of the latter coal at Baltimore at $2.15. Vessels are in fair supply at the minimum rates of the Vessel Owners' Association. The indications are, that the arbitrary rates and rules of this organization are steadily driving away business from the schooners to steamers and the railroads. The increase in the all-rail business to the East is very marked.

Moller, Sierck & Co., sugar refiners, closed a contract for about 8000 tons of coal this week. The New York, Ontario & Western Railroad is in the market for 50,000 tons.

The Myersdale and Broad Top miners have been asked to submit to a reduction of wages from 50 cents to 40 cents, and have struck. The operators of these districts deserve no sympathy. When the other districts were unable to work, owing to a strike among the miners for an advance to 50 cents a ton, the operators in the above-named districts voluntarily advanced wages to 50 cents, and reaped a sufficient harvest to enable them to pay the same wages for the entire year.

The experience of the producers of bituminous coal, derived from ten to twelve weeks of idleness at the mines, and a complete demoralization of the business, should point out the necessity of some organization to meet all important questions that may arise. The present would be a good time to organize, before some emergency arises to antagonize interests and embitter feelings. Such an organization would, in time, undoubtedly grow to be very useful to the entire trade. Had it existed when the late strike was first talked of, that might have been entirely averted or considerably reduced in duration.

A Washington dispatch says: Senator Frye's bill provides that the provisions of schedule N of the act to reduce internal revenue taxation, approved March 3d, 1883, allowing drawback on bituminous coal used for fuel on steam vessels, shall be construed to apply only to United States vessels. It was introduced January 11th, and is still pending before the Commerce Committee, no action having yet been taken. It can hardly reach the calendar this session.

The passage of this bill would considerably increase the demands from steamships, but we see no reason why our own government should be bribed to buy foreign coal instead of American.

Buffalo. June 3.

[From our Special Correspondent.]

Presuming that you will publish the report of the meeting of the Western Anthracite Joint Committee held last Thursday, it will be unnecessary to duplicate the news. Let it suffice to say that the trade is without new features and items of interest. Prices are unchanged for June.

The bituminous coal business is also running in the late grooves; supply is equal to demand for all ordinary purposes, although some large contracts are filling in Ohio, in consequence of scarcity. Prices are without any material change.

The coke trade is steady, both with regard to consumption and quotations. The supply is adequate to the necessities of those needing this article. Rumors of dissatisfaction among the workers at the ovens prevail, but dealers and purchasers do not borrow trouble at all about it.

A local newspaper says that "the coal strike is telling on dock fuel business here as well as elsewhere. Quite a good deal of business is going to Cleveland. All the Western Transit Company's propellers now coal there. The 100,000 ton contract lately made with that company by Messrs. Bell, Lewis & Yates is now filled by that firm over Cleveland docks. The Western Transit Company will have its own docks here ready for business before the season is over, but whether the coal can be had for it will depend on the strike."

The proposition in the Dominion of Canada Parliament to abolish the duty on coal was killed by an adverse majority of 76 votes a few days since.

Since my last letter, there was little demand for lake coal tonnage until Tuesday, when an increased inquiry was manifested. But few vessels were in the market for coal, most of the owners preferring that their craft should leave light or take other heavy merchandise. Grain freights from West to East declined, but iron ore tonnage was still in demand, consequently 55 cents a ton for coal to Chicago was not deemed to be a price worth accepting. To Milwaukee, 60 cents a ton was paid—an advance of 5 cents. This morning, early, 60 cents was paid to Chicago as well as to Milwaukee, with a strong upward tendency, as quite a brisk demand was shown for vessels; but at noon, owners would not accept coal at any price named by shippers, therefore stagnation prevailed on the wharves.

As an illustration of the present method of transportation on the lakes, the propeller Edwards, with three consorts in tow, left this port for Chicago on the 31st of May, having an aggregate of 7400 tons of coal for cargoes.

Coal boats on the canal are scarce, and but little business was done during the past week. The only charters made public were as follows: One load to Troy, at $1.25 net, free in and out; three loads to Syracuse, 65c. net, free out only; and one load to Palmyra, 60c. net, free out only. The nominal rate to New York, $1.50 per gross ton, free in and out.

The coal shipments by lake from May 27th to June 2d, both days inclusive, aggregated 38,550 tons; namely, 23,580 to Chicago, 10,760 to Milwaukee, 2400 to Toledo, 1080 to Racine, 380 to Kincardine, and 350 to Manitowoc; grand total for the season to date, 304,016 tons. The engagements and rates reported were, for net tons, as follows: 55@60c. to Chicago, 55@60c. to Milwaukee, 65c. to Manitowoc, 55c. to Green Bay, 60c. to Racine, 40c. to Kincardine, on contract to Superior City, and 20c. to Toledo.

The season's coal statistics thus far (to June 1st) are as follows: Receipts by lake only 520 tons; shipments by lake for the month of May, 229,480 tons, as compared with 192,240 tons in 1885, and 226,020 tons in 1884; shipments by lake for the season, 301,460 tons, as compared with 192,240 tons in 1885, and 226,020 tons in 1884. Receipts by canals for month of May, 9208 tons, as compared with 2481 tons last year. Shipments by canal for month of May, 2250 tons, as compared with 4285 tons last year.

Parties interested in the coal trade of Buffalo can procure, without cost, from Mr. William Thurstone, the Secretary of the Merchants' Exchange and Board of Trade, his last annual report of the trade and commerce of that city, which includes valuable statistics of the movement of coal for 1886, with comparisons of previous years, besides general topics of interest to the commercial world.

Boston. June 2.

[From our Special Correspondent.]

The anthracite market at this port continues in a state of comparative inactivity. Circular prices for stove sizes have been quoted, but scarcely any coal sold at these figures, particularly as good Stove coal is offered here by individual shippers at $3.25 f.o.b. New York. Broken and Egg, and steam sizes generally, are more firm than domestic sizes, because the former have been over-sold, owing to the large demand while the strike in soft coal was in progress. For Broken and Egg, $3 f.o.b. is a low price for good coal, and the range is extended to $3.10@$3.15, while Nut and Pea are held at $2.85@$2.95, and $1.85@$2.15 respectively. Pea coal might be bought as low as $1.70 @$1.75 for future delivery. Pea and dust continue nominal, and are neither offered nor wanted in any quantity. There is some demand for Buckwheat at $1.30@$1.50 f. o. b., at shipping port, according to quality. The market is quite steady, as seen from developments here, and this steadiness is due to the restriction in output. The talk of a strike apparently elicits no anxiety in the minds of dealers, and no arguments for an advance seem to more than offset the probable decline due to the resumption of work in the bituminous district. No material change in anthracite is expected soon.

There is a greatly improved situation in bituminous coal, now that all the miners are at work again. The supply at shipping ports and in prospect is such that Boston jobbers are selling freely at $2.15@$2.25 f. o. b. at Baltimore and Philadelphia. They fight shy of delivered prices, however, and we learn of no contracts taken "delivered" on a basis of minimum freights. This may very likely come about by and by, when there is a greater urgency to sell. Just now, buyers are more willing to pay reasonable prices than before the strike, and there is considerable inquiry for small lots. In the natural course of things, Nova Scotia coal has had its day, and no more will be sold this season, except a small quantity of culm. The quotation of culm is lower, last sales being at $2.60, delivered, which is 15 cents off.

There is scarcely any thing doing in gas-coal, as the strike holds out so long in that district. The men went out three months ago, and since then, very little coal has been available. We quote gas-coal at $3@$3.10 f. o. b.

But little change is noticeable in freights. We quote rates, exclusive of discharging:

New York, 85@90c.; Philadelphia, $1.05; Baltimore, $1.10@$1.15; Newport News, $1.05@$1.10; Richmond, $1.25; Cape Breton, $1.85@$2; Bay of Fundy, $1.60.

There is a light movement at retail. There is talk of advancing quotations.

Pittsburg. June 3.

[From our Special Correspondent.]

The market since our last issue has been dull. The low stage of water has prevented shipment by the Ohio. The lower markets are well supplied. The best Pittsburg coal can be bought at Cincinnati for 5½@6c. a bushel. Price in this market on board boats: 4@5c. a bushel; railroad rates, 4¼@4¾c.

Connellsville Coke.—The market is steady, with a fair business. The coke-burners, having obtained all they asked for, now want something else, and are again talking strike. The production is the same as last week. Prices are: Blast-Furnace, $1.50 f. o. b. cars at ovens; Foundry, $1.75; Crushed, $2.25.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, June 4.

Little has been doing in the mining market during the past week; but railroad stocks are becoming more of a factor at the Consolidated Stock and Petroleum Exchange every day, and business is growing in this direction. Many of the best commission houses in other cities are sending their orders to this city.

Consolidated California & Virginia was active, but declined from $1.55@$1.35, the closing price. Union Consolidated was firm, with large sales at from 45@47c. Sutro Tunnel remained at 10@11c. Hale & Norcross ruled from $1.90@$2. Savage went from $1.05@85c., but advanced again to 90c., the closing price. Gould & Curry sold at $1. Sierra Nevada, from 38@42c. Best & Belcher from 96c.@$1. Eureka was firm, ranging from $2.20@$2.15.

Colorado stocks were weak, and little animation was displayed in the dealings. Robinson Consolidated sold at 50c. Colorado Central, at $2.45 and $2.40. A sale of 100 shares of Iron Silver brought $1.90 a share. The same amount of Bassick, 8c. a share. Little Pittsburg was firm at 35c. Chrysolite, at 50c.

The largest interest in the Bodie group is still centered in Bulwer, which was active, ranging from $2@$1.70. Bodie varied from $1.40@$1.55. A small sale of Quicksilver Common was made at $4.50 a share.

Horn-Silver has slightly advanced from $2.75@$3; Ontario remained at $29.75 and $29. Stormont sold at 14c.

Homestake has been higher, selling up to $21. Rappahannock, at 11c. and 12c. Alice, at $1.80.

The transactions amounted to 47,263 shares, a decrease of 13,037 shares, compared with the preceding week.

Coal Stocks.

The general stock market has been quite active and strong during the past week. Confidence in improving conditions is increasing constantly, and much higher prices for stocks are generally looked for. The

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share.												Sales from May 29th to June 4th, inclusive.
		May 29.		May 31.		June 1.		June 2.		June 3.		June 4.		
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Barclay Coal														
Cameron Coal	50	20	18¼			21	20	20½	19½	20	19½	20	19½	16,133
Col. C. & I	10					24¼	23¾	24	23¾	25⅛	24	24¼		2,930
Ches. & O. RR	100					9				9		9		410
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100	98⅞	98⅛			99	98¼	98⅛	97¼	97⅞	96¾	98	97¼	12,545
D., L. & W. RR	50	130¼	128¾			131⅛	130¼	130⅛	129⅜	130	128½	130	128¾	164,090
Elk Lick Coal Co														
Lehigh C. & N.†	50					50¾	50½	50⅞	50½					2,074
Lehigh Valley RR.†	50					57		56½						431
L. & W. C. & I Co														
Maryland Coal	100	11						11				11		250
Montauk Coal	100													
Morris & Essex	50													
New Central Coal	100	10¾												100
N. J. C. RR	100	52⅞	51¾			53⅜	52¾	52⅜	51⅛	52⅛	51⅝	52½	51¾	27,308
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR.†	50					53⅛	52¾	53	52¾					2,821
Ph. & R. RR.*	50	24	23⅜			23½	23	22⅞	22	23⅝	22⅝	23		12,052
Spring Mountain	50													
Westmoreland Coal†	50													

* Of the sales of this stock, 5,157 were in Philadelphia, and 6,895 in New York.
The quotations for these stocks are not percentage, but actual price. Total sales, 241,144.

favorable reports for our own crops and the unfavorable ones from abroad create hopes that we are to have a large movement of grain at profitable prices to the farmers and liberal rates to the railroads for carrying. The coal stocks have been strong in sympathy with the general movement, but have shown a little weakness the past two days. In fact, it is realized that the coal trade is not encouraging at the moment, and that the immediate prospects are rather in favor of a worse condition for some weeks at least, and stock operators prefer to await better defined indications of the fall market.

The sales of Lackawanna aggregate 164,090 shares, at $131⅛@$128½, closing at $129½. The dealings in Delaware & Hudson amount to 12,545 shares, at $99@$96¾, closing at $98. Jersey Central sold at $53⅝@$51⅛, and closed at $52¼, with sales of 27,308 shares. Reading sold at $23½@$22, and closed at $23, with sales of 6895 shares.

The receivers of the Philadelphia & Reading Railroad Company will purchase on and after June 11th, at the rate set opposite the names of the respective tracts, the interest and coupons due June, 1886, of the following divisional coal land mortgage bonds of the Philadelphia & Reading Coal and Iron Company, guaranteed by the Philadelphia & Reading Railroad Company: Hartman & Myer, Reed *et al.*, due June, 1886, rate 6 per cent; Forbes & Delano *et al.*, due June, 1886, rate 5 per cent; Richard Wood Estate, due June, 1886, rate 4 per cent.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Coalburg Land and Mining Company, Dunmore, Pa., June 8th, from four to five o'clock P.M.

Central Coal Company, office of Messrs. George B. Newton & Co., No. 329 Walnut street, Philadelphia, June 13th, at twelve o'clock M.

Grand Portage Copper Mining Company, Hancock, Mich., June 7th, at eleven o'clock A.M.

Quicksilver Mining Company, No. 20 Nassau street, New York City, June 16th, at one o'clock P.M.

Pipe Line Certificates.

Messrs. Watson & Gibson, stock and oil brokers, No. 49 Broadway, report as follows for the week:

Oil has been inclined to strength this week, and on Wednesday gained five cents from Saturday's lowest figures. There has been no special change in the field, and the bulls took advantage of the lull in news to mark up prices. There is not much to say concerning the market, except that production is now up to consumption, prices low, and the Washington field still dangerous and undefined. We should prefer to buy rather than to sell the market, as the whirligig of speculation is likely to bring around a further advance shortly.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
May	29	62¾c.	64c.	62c.	63¾c.	3,108,000
	31					
June	1	62½	65¼	62⅝	65⅛	5,950,000
	2	65⅛	67¼	64⅛	65¼	10,983,000
	3	65	65⅝	64⅛	64¾	3,783,000
	4	64⅝	66⅛	64⅛	65⅛	4,753,000
Total sales, barrels						28,577,000

Dividends.

Brooklyn Lead Mining Company, of Utah, has declared a dividend of five cents a share, payable June 5th, at No. 25 Park Row, New York City.

Delaware & Hudson Canal Company has declared a dividend of one and a quarter per cent, payable June 15th, at the National Bank of Commerce, New York City.

Granite Mountain Mining Company, of Montana, has declared dividend No. 19, of twenty-five cents a share, or $100,000, payable on the 2d inst., at St. Louis.

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Andes, Nev.					.25
Baker Divide, Cal.	11	May 3.	June 7	June 28	.25
Belle Isle, Nev.	9	May 5.	June 9	July 1	.10
Belmont, Nev.	40	Apl. 30	June 5	June 28	.10
Bodie Tunnel, Cal.					.25
Bowman, Nev.		May.			.05
Carbonate Hill, Dak.	1	May 11	June 17	July 2	¼
Champion, Cal.	21	Apl. 13	May 20	June 8	.10
Chollar, Nev.	20	May 21	June 24	July 15	.50
Con. Amador, Cal.	*12	Apl. 30	May 31	June 16	.25
Crocker, Ariz.	3	May 25	July 6	July 28	.20
Darboy, Dak.	1	Apl. 21	May 25	June 15	.01
Eureka Con., Nev.	9	Apl. 20	May 31	June 22	1 00
Golden Prize, Nev.	6	Apl. 19	May 21	June 22	.30
Grand Prize, Nev.	18	April 9	May 17	June 7	.40
Hale & Norcross, Nev.	90	May 10	June 14	July 7	.50
Holmes, Nev		May 21			.50
Homew'd B'nd, Dak.	1	May 25	June 26	July 20	¼
Jumbo, Dak	1	May 11	June 15	June 28	¼
Justice, Nev.	44	May 12	June 16	July 6	.10
Live Oak Dritt, Cal.	1	May 25	June 30	July 22	.05
Liberty, Dak.	3	May 24	June 25	July 12	.02
Lucky Hill Con., Nev.	3	April 5	June 7	July 7	.05
Mammoth, Utah		Apl. 21	June 10	July 10	.10
May Flower Grav., Cal	30	Apl. 30	June 4	June 25	.25
McMillen, Ariz.	6	April 9	May 14	June 8	.20
Mutual, Dak	2	Apl. 17	May 20	June 12	.02
North Peer, Ariz.		May 20			.02
Pocahontas, Dak	1	Apl. 15	May 16	June 15	.02
Peer, Ariz	5	Apl. 13	May 20	June 16	.10
Peerless, Ariz	8	May 12	June 22	July 16	.50
Potosi, Nev.	23	Apl. 16	May 20	June 9	.30
Red Warrior, Utah		April 6	May 17	June 5	.02
Ruby Hill, Nev	11	Apl. 12	May 12	June 15	.01
Sampson, Utah		Apl. 17	May 25	June 28	.25
Sierra Nevada, Nev.	85	May 27	July 1	July 20	.20
Silver Hill, Nev	23	April 21	May 27	June 18	.10
Silver Ridge, Dak.	1	May 13	June 17	July 17	.01
Union Con., Nev.	33	Apl. 19	May 26	June 17	.25
West Galena, Dak.		Apl. 13	May 29	June 19	¼

* Assessment No. 11, levied April 7th, 1886, of $1 a share, was rescinded, and assessment No. 12, of twenty-five cents a share, levied as above.

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, June 3.

The market for copper stocks in the early part of the week was quite active, with a slight improvement in prices; but since the holiday, it has relapsed into a summer dullness, with but very little doing and no special feature. Calumet & Hecla opened at $218 for a small lot, and advanced to $220, with sales of 67 shares, closing weak at $217 bid, $218 asked. Quincy, dull at $45, a decline of $1 from last week's closing sale. Franklin recovered a little from the extreme depression of last week, and advanced from $8⅛@$9 on sales of 410 shares, and was quite strong to-day at $9¼ bid, $9½ asked, without sales. Atlantic declined from $10, last sale, April 26th, to $7½ for 100 shares, and at that price is extremely cheap. Huron sold at $1¼ (450 shares), same as last week, with no stock offered now under $2. A small lot of Osceola sold at $13. The rest of the list was unchanged. Total sales of copper stocks about 1100 shares.

In silver stocks, there seems to be a little demand for Napa Quicksilver, and all lots offered at $1 are taken, with sales of 1800 shares at that price. Catalpa sold at 27½c. Boston & Montana declined from $6@$5¾ for 200 shares.

At the Mining Exchange, Bowman was in good

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	May 28.	May 29.	May 31.	June 1.	June 2.	June 3.
Albion						
Alpha						
Alta	.45	.45		.45	.40	.40
Argenta						
Bechtel						
Belcher	1.12½					
Belle Isle						
Best & Belcher				.95	.95	.95
Bodie	1.50	1.50		1.50	1.50	1.37½
Bullion						
Bulwer	1.75	1.87½		1.62½	1.87½	1.62½
Challar	.35	.55		.60	.50	.50
Con. Pacific	.35				.35	
Con. Cal. & Va.	1.50	1.50		1.50	1.37½	1.37½
Crown Point				.90		
Day						
Elko Cons						
Eureka Cons		2.37½		2.25	2 25	
Exchequer						
Gould & Curry	.90	1.00		1.00	1.00	.90
Grand Prize						
Hale & Norcross	2.00	2.00		2.00	1.87½	2.00
Independence						
Martin White						
Mexican	.40				.40	.40
Mono	2.75	2.62½		2.50	2.50	2.50
Mount Diablo	3.12½			3.25		
Navajo	.60	.65		.60		.50
Northern Belle						
North Belle Isle						
Ophir	.50				.50	.55
Overman						
Potosi	.60	.55		.60		.55
Savage	.95	.95		1.00	.90	1.00
Scorpion						
Sierra Nevada	.40	.40		.45	.40	.40
Silver King						
Tip-Top						
Union Cons	.45					.45
Utah	.50					.50
Wales Cons						
Yellow Jacket					.85	.80

Unlisted Stocks and Foreign Quotations.

We give below the most reliable quotations obtainable for unlisted stocks and quotations on outside and foreign exchanges:

NAME OF COMPANY.	Location.	Price.	Where quoted.
Adams, s. L.	Colo.	$4@$5	Unlisted
Bellevue, s. L.	Idaho.	$5	Unlisted
Big Bend H'dr'lic, G.	Dak.	$5	Unlisted
Bird's Eye Creek, G.	Cal.	$4.37½@$5.62½	London
Bonanza King, G	Cal.	$10	Unlisted
California, G	Colo.	75c.@$1.00	London
Colo. United, s. L.	Colo.	$10.00@$12.50	London
Eb'rh'dt & Mon't'r, s	Nev.	$3.00@$3.50	London
Elkhorn, G. s.	Mont.	$10	Unlisted
Gold Hill, G	N. C.	$1.87½@$3.75	London
Granite Mt., s	Mont.	$25@$28	St. Louis
Honorine, s. L.	Utah.	75c.	Unlisted
Iron Hill, s	Dak.	$7@$7.50	Deadwood
I. X. L., G	Cal.	31¼@93¾c.	London
Kohinoor & Donaldson, G. s.	Colo.	50@62c.	London
La Plata, s. L.	Colo.	$1.56@$2.18¾	London
La Trinidad, s	Mex.	$20.00@$22.50	London
Lexington, G. s	Mont.	$12	Paris
"Org'niz'rs' shares	Mont.	60c.	Paris
Montana, Lt., G. s.	Mont.	$40.00@$41.25	London
New Albion, G	N. S.	$4.50@$4.75	London
New Emma, s	Utah.	62@87c.	London
New Hoover Hill, G.s	N. C.	$1.00@$1.25	London
Oxford, G	N. S.	$1.25@$1.87½	London
Placerville, G	Cal.	$1.25@$1.50	London
Plumas Eureka, G.	Cal.	$2.50@$3.75	London
Richmond Con., s. L.	Nev.	$25.00@$27.50	London
Ruby & Dunderberg, G.	Nev.	$1.12@$1.37	London
Russell Gold, G.	N. C.	75@87c.	London
Sierra Buttes, G	Cal.	$6.25@$7.50	London
Silver Queen United, s	Mex.	$10.00@$10.62½	London
Small Hopes, s	Colo.	$7.00	St. Louis
St. Joseph's, L.	Mo.	$7@$7.50	Unlisted
Uncle Sam, s	Dak.	$3	Deadwood
United Mexican, s.‡	Mex.	$14.37½@$15.62½	London

Foreign quotations are per mail advices.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to June 4th :

To	From Philadelphia	From Baltimore.	From New York shipping ports.
Alexandria	.80		
Baltimore	.58§		
Bangor	1.05*		
Bath, Me	1.05*	1.15	.90*
Beverly	1.05*		.90*
Boston, Mass	1.05*	1.15	.85*
Bristol			
Bridgeport, Conn.			.55
Brooklyn			.18§
Cambridge, Mass.	1.05*‡		.85*‡
Cambridgeport	1.05*‡		.85*‡
Charleston, S. C.	.70	1.00	
Charlestown	1.05*		.85*
Chelsea	1.05*		.85*
Com. Pt., Mass.	1.10*		
E. Boston	1.05*		.85*
East Cambridge	1.05*‡		
E. Gr'nwich, R. I.			.80
Fall River			.75@.80
Gardiner, Me	1.10*		
Georgetown, D. C.	.80		
Gloucester	1.15*		
Lynn	1.15@1.25*		
Newark		1.35***	
New Bedford	.90*		.85
Newburyport			
New Haven		1.05@1.10	.55
New London			.75
Newport			
New York		1.00	.18§
Norfolk, Va	.50		
Norwalk, Conn.			
Norwich			.75@.80
Pawtucket	.90†		
Portland, Me	1.05*	1.15	
Portsmouth, N.H.	1.15*	1.25	.95*
Providence	.90@1.00*	1.05@1.10	.75@.85
Quincy Point			
Richmond, Va	.75		
Roxbury, Mass.	1.05*		
Saco	1.15†		
Salem, Mass.	1.05@1.10*		.85*
Savannah	.80		
Somerset			
Washington	.80		

* And discharging. † And discharging and towing. ‡ 3c. Per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. ** Below bridge. *** Old B. L.

request, and advanced to 16c., assessment paid. Dunkin, dull at 26c. bid, 28c. asked. Catalpa, 25c. bid.

Business at the Exchanges is generally dull and featureless, with no prospect of improvement in this line of specialties.

ROTHWELL'S

CONTOUR MAP OF THE WYOMING VALLEY.

CONTOUR LINES TEN FEET APART, VERTICALLY; the elevation of every point above sea-level is given.

A few copies are for sale.

Price : On thick, heavy paper $20
On bond paper, for mounting 25

The six sheets can be mounted separately, or on a single roll 15 feet long by 42 inches wide. Scale, 1000 feet to the inch.

REFERENCE BOOK

OF PRACTICAL AND SCIENTIFIC INFORMATION

FOR THE USE OF

COLLIERY MANAGERS.

Written with a View to Assist Candidates in Passing their Examinations for Certificates of Competency as Colliery Managers. By W. Wardle, M.E., C.C. London. 1880. 8vo, 191 pages, 101 Illustrations (many of them full-page). $4.25.

THE SMELTING OF COPPER

SWANSEA DISTRICT OF SOUTH WALES

From the Time of Elizabeth to the Present Day.

By COLONEL GRANT-FRANCIS, F.S.A., author of "Swansea Charters," etc. Second Edition. Beautifully illustrated. London. 1881. Demy 8vo. 193 pages. Half bronze roan, with malachite insides and gilt top. Price $4. Quarto, large paper, half oronze roan, etc., $6. Among the illustrations are a number of reproductions of scarce engravings. Address

THE SCIENTIFIC PUBLISHING CO.,
27 Park Place, P.O. Box 1833,
New York

SPECIAL NOTICES.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE.

Those applying for the positions here gratuitously advertised should be *subscribers* to the ENGINEERING AND MINING JOURNAL, and should inclose the necessary postage, for forwarding their letters.

62 WANTED—AN ACTIVE YOUNG MAN with some capital to invest ; can obtain a paying interest and position in a mining machinery business ; one having technical knowledge preferred.
Address MACHINIST,
Care of ENGINEERING AND MINING JOURNAL.

70 WANTED—A YOUNG MAN AS ASSISTant Superintendent ; one conversant with Foundry practice, and of some experience in the management of a large force of mechanics preferred. Address, with references, FOUNDRY,
Care of ENGINEERING AND MINING JOURNAL.

71 WANTED—A MASTER MECHANIC who is a graduate of a polytechnic college ; one preferred who has practical experience in the duties of the position. Apply, stating experience, references, and age, MECHANIC,
Care of ENGINEERING AND MINING JOURNAL.

72 WANTED—AN EXPERIENCED DRAFTSman, on hoisting and mining machinery. Apply stating extent of experience, age, and salary expected.
DRAFTSMAN,
Care of ENGINEERING AND MINING JOURNAL.

74 WANTED—A PRACTICAL MAN EXPErienced on automatic and plain engines, blast-furnace, architectural and iron house work, locomotive, etc., and who is accustomed to handling men, as foreman of a machine shop. Apply, stating salary expected, experience and references, SHOP,
Care of ENGINEERING AND MINING JOURNAL.

75 WANTED—AN EXPERIENCED SUPERintendent for a hydraulic gold mine in North Carolina. Fair salary and permanent employment to a thoroughly competent man. Apply, with references, stating salary required, CLAY,
Care of ENGINEERING AND MINING JOURNAL.

76 WANTED—A FIRST-CLASS MAN, with good address, acquainted with mines and mine machinery. A good salary and steady situation to the right man.
HERALD,
Care of ENGINEERING AND MINING JOURNAL.

77 WANTED—FOR A SMALL CHEMICAL factory, a foreman who understands machinery. Apply, with reference, FOREMAN,
Care of ENGINEERING AND MINING JOURNAL.

CORNING, FREDERICK G.,
Mining Engineer,
No. 78 BROADWAY, NEW YORK,
Will be absent from the city on professional work till June 20th.

TRAUTWINE'S

ENGINEERING WORKS

CIVIL ENGINEER'S POCKET-BOOK (25th thousand, 1886), revised and enlarged ; 866 pages, morocco flaps, **$5.00**

Prices and descriptions of manufactured articles, etc., revised to date.

RAILROAD CURVES. Twelfth revised edition. 1886. Limp calf, - **2.50**

EARTHWORK. MEASUREMENT AND COST. New revised edition, shortly, - - - - - - - **2.00**

PUBLISHED AND FOR SALE BY

JOHN WILEY & SONS,
15 Astor Place, New York.

*** *Mailed and prepaid on the receipt of the price. Special terms when ordered in quantity. Catalogues, circulars, and specimen pages gratis.*

HYDRAULIC MINING, by Aug. J. Bowie, Jr., is the most complete text-book extant, says Prof. R. W. Raymond. Sold at the office of the ENGINEERING AND MINING JOURNAL, No. 27 Park Place, P.O. Box 1833, New York, for $5.

DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET.
NEW YORK, May 17, 1886.
DIVIDEND NO. 37.
The Board of Trustees have declared a dividend of TWENTY-FIVE THOUSAND DOLLARS, the same being *twenty-five cents* per share of the capital stock of the company, payable on the fifth day of June, at the Company's offices in New York and San Francisco.
W. VAN NORDEN, President.

OFFICE OF BROOKLYN LEAD MINING COMPANY, No. 25 PARK ROW, NEW YORK.
At a regular meeting of the Trustees of the Brooklyn Lead Mining Company, held May 27th, a dividend of FIVE CENTS A SHARE was declared, payable on and after June 5th.
Transfer-books will close June 1st to 6th.
WILLIS McDONALD,
Secretary and Treasurer.

STEAM-ENGINES AND HOISTING AND WINDING MACHINERY
For Mines and Inclines.

Stationary Steam-Engines for General Use.
Estimates Furnished on Application.
THOMAS CARLIN, Allegheny, Pa.
Write for stock list of Second-hand Engines and Boilers.

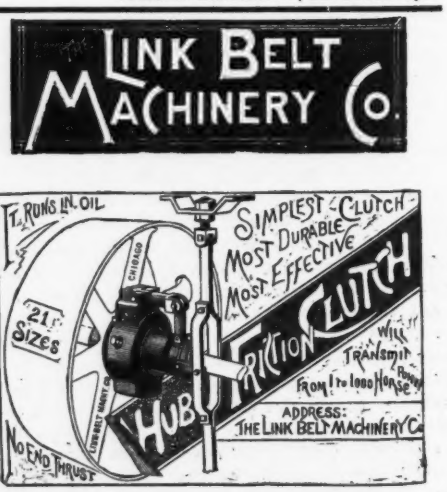
DRAWINGS OF ALL KINDS,
ROUND WRITING, ETC.,
Made by competent draftsmen. Inquire of
KEUFFEL & ESSER,
MATHEMATICAL INSTRUMENTS,
127 Fulton Street, - - New York City.

WANTED—POSITION AS MANAGER, superintendent, or head draftsman, by mechanical engineer who has had many years' experience on hoisting and pumping engines, air-compressors, mining machinery, and refrigerating machines ; best of references. Address W. W. B.,
Care ENGINEERING AND MINING JOURNAL.

A MINING ENGINEER DESIRES POSITION. Six years' practical experience ; at present engineer of large iron mines ; good draftsman ; accustomed to designing machinery.
FOOT WALL,
Care ENGINEERING AND MINING JOURNAL.

WANTED—BY AN ENGLISH ENGINEER, with thorough practical training in colliery work, a position as superintendent ; can furnish highest testimonials and references. Address T. W. C.,
Care of ENGINEERING AND MINING JOURNAL.

A CIVIL ENGINEER OF 15 YEARS' experience, construction of railroads, hydraulic works, etc., city and mine surveying, desires a position. He is a good draftsman, well up with transit and level instrument. Address A. A., ENGINEERING AND MINING JOURNAL P. O. Box 1833, New York.

WANTED—
A contractor to take a lease of Eastern concentration works at a per ton rate—75 tons a day.
Address CONCENTRATES,
Care of ENGINEERING AND MINING JOURNAL.

FOR SALE.—A WHITE & HOWELL ROASTing and Desulphurizing Furnace, Crusher, and Pulverizers. On storage in city. Price, $1250. Daily capacity 25 tons.
WALTER HAMILTON, 141 Broadway.